

MAY 1995

# HP Professional

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**RAD Roll Call**

**Industry Watch:**

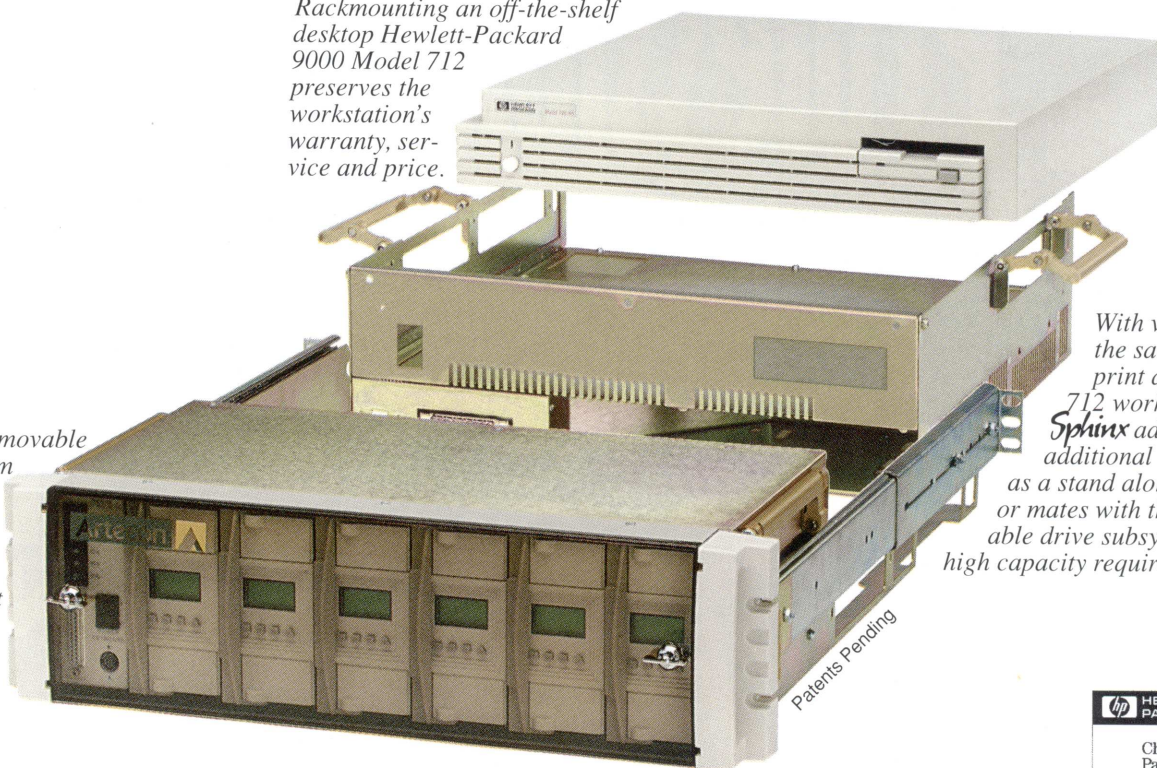
New HP 3000 and  
HP 9000 Servers,  
Intel's P6, HP's New  
Consumer PCs



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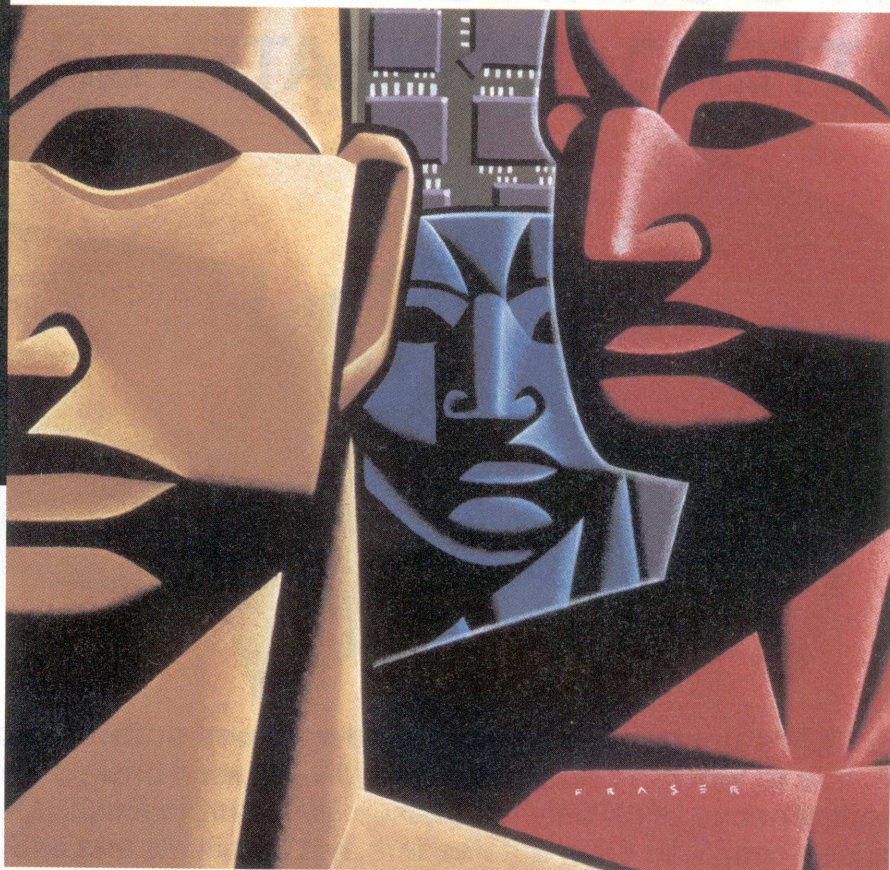
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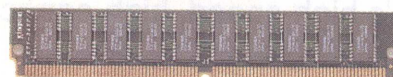


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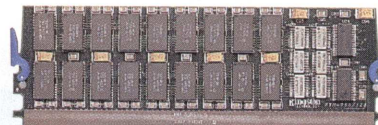
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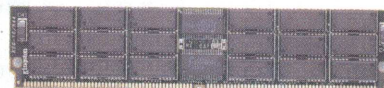
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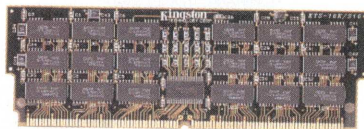
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*Software defects can be reduced with disciplined techniques. Keep bugs from killing your software, and maybe more, by using automated testing tools. Learn which products and techniques work best in your environment.*

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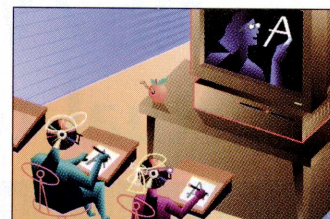
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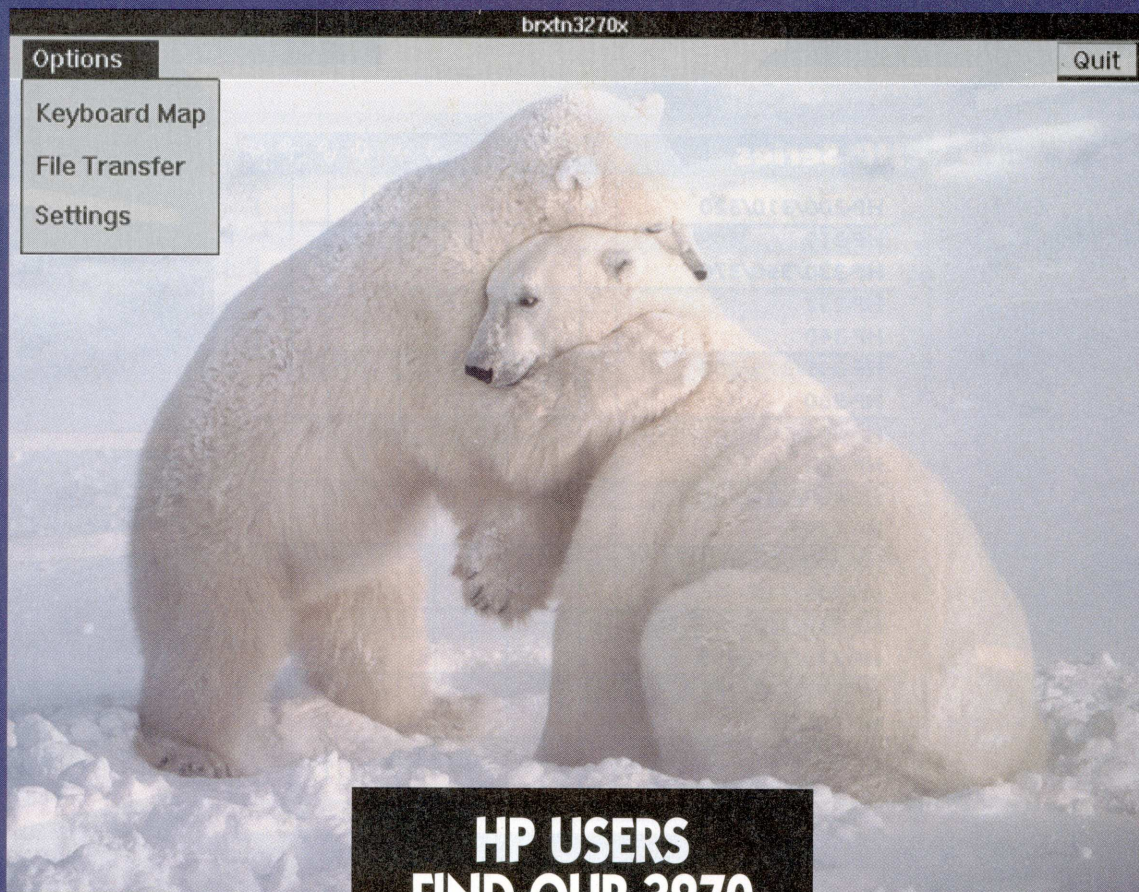
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# NT Rex Walks Tall In UNIX Park

## Evolution Or Early Extinction For Microsoft's Enterprise OS

It's that time of year again kiddies. Like a sequel to Jurassic Park, Windows NT is baring its saber-tooth marketing teeth. And its deafening roar has some vendors fearing being devoured alive. Last time, the mere announcement of the impending birth of Windows NT sent Neanderthal UNIX vendors scrambling from their caves to create a united modern, civilized front in order to stop the evil beast.

During the keynote at Uniforum '95 in Dallas, Ed McCracken, chairman and CEO of Silicon Graphics, took a stand against the popular media's habit of believing everything Bill Gates says. Citing a March article in the *Wall Street Journal* titled "Sellers of UNIX Systems Adopt Standard In Bid To Fight Off Microsoft's Advance," McCracken went on the record saying that "Silicon Graphics has not supported, is not supporting and has no development underway to support NT on SG systems."

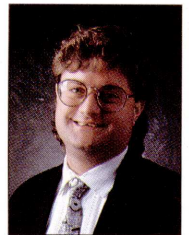
Likewise, Nigel Ball, marketing director for HP's General Systems Division, told me that HP is in no way adopting NT as its next operating system. And next month, with the industry-wide release of HP-UX version 10.0, will HP just become a Microsoft VAR or DAR? I think not. That would mean trashing several years and millions of dollars in investment.

In Dallas, I visited Dealey Plaza. You know, the place Oliver "I wish I remembered the 60s" Stone chose to rewrite history. Anyway, I just couldn't resist making a correlation between Windows NT and the infamous magic bullet.

Windows NT, fired from a \$12 rifle, zigs, then it zags; then it stops in mid air, then it turns back and takes out all its intended targets leaving gaping holes in its path, only to emerge clean and pristine ready to do more damage. If IT managers thought like Senator Arlen Specter, Windows NT would be a bonanza for Microsoft. But I believe most managers will put a little more thought into their strategies.

Of course, I'm not naive enough to think that NT is just part of a big, scary conspiracy. But, I am saying (and you read it here first) it will not be the server OS of choice replacing UNIX, especially HP-UX, no matter what chips get cranked out over the next 10 years. Are users really going to bet their shop on a new untested, unproven system? Hell, it took them over a decade to make a commercial success out of UNIX.

Sure, people are "preparing to include NT" in their IT plans. For example, 25 percent of our readers expressed an interest in learning more about Windows NT. But for the most part they seem to be "looking," or are "curious" about it; then again, you can overhear those same words from tourists at the La Brea Tar Pits. Are users going to trade in one monolithic mainframe mastodon for another? Think about it.



By Charlie Simpson

*Charlie Simpson*

[simpson@cardinal.com](mailto:simpson@cardinal.com)

Interested in where to store massive amounts of data and information? Then you won't want to miss the June issue of *HP Professional*.

Dedicated to multiplatform storage management, our June issue will explore the promises and pitfalls of mass storage in distributed computing environments. Topics will cover the differences between IBM AS/400 and HP 9000 storage products, HP's AutoRAID technology, as well as new concepts in centralized storage. And that's just a sample.



# Hang In There

Working in corporate Canada now seems very similar to working in the United States. It was therapeutic to hear someone speak out against short-sighted business strategies and lack of communication with employees.

Being new (and not well-versed) in the area of office politics and finances, I sometimes feel ill-equipped to deal with the stresses and complications added to the work I actually enjoy doing. Your editorial [in the January 1995 issue] gave me a better understanding of the reasons behind what I feel, and thus provided some tools for coping.

David Dean  
Systems Analyst  
Ottawa, Ontario

*Sometimes all we need to know is that we're not alone out there. We're glad we could help.*

---

## TO TEN OR NOT TO TEN

Fred Mallett's article in the March 1995 issue is to me, quite frankly, the most valuable piece of news I've seen in *HP Professional*. It has saved me from a great deal of future irritation, because one paragraph persuaded me to *not* install HP-UX 10. That paragraph is the second to last in the article, in which the new nitwittery about the two-user license on the HP 9000 Series 700 is described.

As the system administrator for the [HP 9000 Model] 735 I use, as well as a developer for several different applications, I frequently need to open HP VUE as root, then **su** to one or more userids to resolve the current problem. More importantly, like many of my coworkers, I have hpterm and xterm open simultaneously as different userids, such as "oracle," associated with specific software packages. At the console, I am only one user, regardless of the number of identities I might take.

This approach by HP is not just "... bound to cause some problems." It is a fatal flaw and should be cause for rejection of HP-UX 10 by every [HP 9000 Series] 700 user. For the many people in situations similar to mine, even the eight-user license would be insufficient.

R. G. Oesterling  
Advisory Scientist  
Idaho National Engineering Laboratory

## OLAP DEFINED

In regards to George A. Thompson's article "SAS Causes Flap Over OLAP" from the Industry Watch in the March 1995 issue, I'd have found it helpful if you'd defined the acronym involved. What is OLAP?

Thomas J. Foley  
Methodology Technical Aide  
Boeing Commercial Airplanes

*OLAP is the acronym for Online Analytical Processing. The term was first coined by E.F. Codd, the relational database guru, as a way to distinguish it from Online Transaction Processing (OLTP). Many people tend to think of multidimensional databases when they think of OLAP but data warehousing and SQL-based decision support tool vendors are also claiming OLAP capabilities. Although it hasn't been actively promoted, HP has its own Open Warehouse Program.*

*We already examined some of the finer points of OLAP and OLTP in our December 1994 issue. And you can expect us to continue our investigation this year as well. — GAT*

---

## BACK PAGE BRAVO

I'm glad to see you turning over the back page of each issue to the readers. Keep up the good work!

Bob Gignac  
Technical Services  
Speedware Corp.

*HP Professional welcomes comments from its readers. Letters may be edited for brevity and clarity, and should be addressed to: HP Professional, 1300 Virginia Dr., Ste. 400, Fort Washington, PA 19034. Fax number: (215) 643-4827. Internet address for staff listed on the masthead: LASTNAME @ CARDINAL. COM  
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## INDUSTRY WATCH

George A. Thompson

## CHIPS A GO-GO

In March, HP introduced their latest RISC CPU, the 64-bit PA-8000, which will be available in systems within the next 12 months. But in the meantime, HP's PA-7200 CPU (introduced in March 1994) has found a home in its HP 3000 and HP 9000 product lines.

The HP 3000 9x9KS Series includes five new servers using an 80 or 100 MHz version of the PA-7200 chip while a 100 MHz version is used in all three models of HP's new Series 9000 "K" class UNIX servers.

The K class includes the uniprocessor Model K100, and Models K200 and K400, capable of supporting up to four-way symmetric multiprocessing (SMP). The K class "hits the sweet spot of the market," says Jim Brennan, senior director for Workgroup Technologies. "Many sites will be able to remain within the K class cabinet for several years because of the expansion capability by the additional three processors and readiness for the next gen-

eration for the PA-8000 CPU. The K100 and K200 can both be upgraded to the K400 with a boardswap (\$10,000 for each additional CPU). More importantly, K class users will be able to upgrade to the PA-8000 CPU when it is available.

Brennan points out that a four-way CPU model has a price/performance advantage over a SPARCserver 1000 with eight CPUs. The K servers also offers a stronger graphic subsystem. Compared to DEC's Model 2100 (with four CPUs), the K servers offer higher floating point performance and I/O bandwidth. Brennan thinks that IBM's RS/6000 servers won't be able to compete until the PowerPC

## HP 9000 K-Class SMP Servers

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Maximum I/O Expansion Slots	5 I/O Slots (4 HP-PB and 1 HP-HSC**)	5 I/O Slots (4 HP-PB and 1 HP-HSC**)	13 I/O Slots (8 HP-PB and 5 HP-HSC**)
Maximum I/O Bandwidth	128 MB/sec.	128 MB/sec.	256 MB/sec.
Maximum Storage w/External Cabinets	2.3 TB	2.3 TB	5.2 TB
PA-RISC Processors Supported	PA-7200	PA-7200 PA-7200 Enhancements	PA-7200 PA-7200 Enhancements PA-8000
Pricing (U.S.)	\$21,270 (32 MB RAM, 1 GB SCSI-2 F/W/D disk, CD-ROM, LAN, 2-user HP-UX)	\$33,650 (64 MB RAM, 2 GB SCSI-2 F/W/D disk, CD-ROM, LAN, 2-user HP-UX)	\$60,350 (128 MB RAM, 2 GB SCSI-2 F/W/D disk, CD-ROM, LAN, 2-user HP-UX)

\*\*HP-HSC—High Speed System Connect

## HP 3000 Series 9x9KS SMP Servers

Model		939KS		959KS/100		959KS/200		959KS/300		959KS/400	
TPS		195		260		455		624		835	
# of Processors		1		1		2		3		4	
Supported User Levels		64/100/160/256/384/UNL									
I/O Slots		4	8	4	8	4	8	4	8	4	8
CPU Technology		PA-7200									
Cache instruction/data		256/256 KB per processor									
Clock Freq (MHz)		80		100		100		100		100	
Std./Max. Memory (MB)		64/1,856		128/2,048		128/2,048		128/2,048		128/2,048	
Disk Max. (GB)		196	352	196	352	196	352	196	352	196	352
U.S. List (\$000s) includes IMAGE/SQL and MPE/iX	64 users	\$ 85	\$ 89	\$117	\$121	\$132	\$136	\$147	\$151	\$162	\$166
	100 users	106	110	138	142	153	157	168	172	183	187
	160 users	136	140	168	172	183	187	198	202	213	217
	256 users	163	167	195	199	210	214	225	229	240	244
	384 users	182	186	214	218	229	233	244	248	259	263
	Unl users	184	188	216	220	231	235	246	250	261	265

604 CPU becomes available later this year. On the other hand, Silicon Graphics servers provide competitive performance, but the K class models offer a price advantage, says Brennan.

Because of its well-balanced design, you can expect to see K class servers sold in technical markets as a solution for NFS file serving, mechanical and electronic design automation (MDA/EDA), software development and geographical information systems (GIS). HP has an opportunity here, because Sun has recently turned its attention to the commercial market.

Some analysts have commented that the 100 MHz speed of the CPU is slower than they had expected, but Brennan says it's an empty argument. Overall, he says, with its I/O bandwidth, main memory, processor bus speed and total storage, the K class servers are well tuned for their use in a broad range of commercial and technical applications. Also, he points out that although HP will continue to sell and support the G, H and I class servers, the K series "from a price/performance perspective effectively replaces those servers." ●



## A PEEK AT P6: TWO, TWO, TWO CHIPS IN ONE

In March, at the International Solid State Circuits Conference (ISSCC) in San Francisco, Intel disclosed the architectural details of the P6—its Pentium CPU successor.

Details include the requisite x86 binary compatibility, a 64-bit external data bus, a 32-bit address bus, two on-chip 8 KB (two-way set-associative) instruction and an off-chip (four-way set-associative) data cache. Intel claims the P6 (fabricated using a 2.9V, 0.6 micron BiCMOS process) will operate at 133 MHz and have twice the performance of a Pentium. With 5.5 million transistors, the P6 more than doubles the 2.2 million transistor count of the Pentium.

The P6 also will have an off-chip 256 KB SRAM Level 2 (L2) cache. However, the cache die (with 15.5 million transistors) is tightly coupled with the CPU in the same 387-pin ceramic package, or dual-cavity PGA as Intel calls it. In other words, it's two chips in one—a first for volume microprocessors. With its own dedicated bus, the P6 design is optimized at the system level, also unusual for a mass market chip. "The design of the P6 is impressive," says Linley Gwennap, editor-in-chief of *The Microprocessor Report* (Sebastopol, Calif.). "It's a significant improvement for PC performance. And it shows that Intel has once again significantly closed the RISC/CISC gap."

The P6's performance depends heavily on a collection of techniques that Intel collectively calls Dynamic Execution—multiple branch prediction, out of order execution and speculation execution. Most often used in RISC chips, these algorithms allow the CPU to process instructions in the most efficient way possible.

You may have noticed that Intel's Dynamic Execution is similar in concept to HP's Intelligent Execution implemented on its new PA-8000 CPU (see *Industry Watch*, April 1995). That's especially interesting in light of HP and Intel's joint development agreement last July. However, neither the PA-8000 nor the P6 are the result of that agreement, despite some press to the contrary. Al-

## NOTABLE QUOTABLES

**"The siren song of Microsoft may beckon you; but if history has taught us anything, it is that this road is a slippery slope leading toward subservience to a monolith."**

— Edward R. McCracken  
Chairman and CEO of Silicon Graphics  
from his opening keynote address  
at Uniforum '95 (March 14, 1995)

though HP and Intel are currently working on that project, a new HP/Intel chip is not expected until the end of the decade. In the meantime, both companies are revealing few, if any, details.

The P6 will initially have a 133 MHz clock speed and provide more than 200 SPECint92 (according to Intel's estimates).

By contrast, HP's PA-8000 is twice as fast, says Gwennap. PC systems containing the P6 are likely to appear at the end of this year or the beginning of next year. For more details on the P6, dial up Intel's new home page on the World Wide Web (WWW) at <http://www.intel.com>. ●

## WAREHOUSE? THERE HOUSE!

Have you noticed the quantum leap in the number of vendors making data warehousing announcements? In February, HP expanded its data warehousing act by adding the Intelligent Warehouse Guide to its Intelligent Warehouse (IW) solution and by adopting and integrating Software Interfaces' ProReports reporting tool into its OpenWarehouse Program.

Although not very well known, the six-year-old OpenWarehouse Program came about as HP tried to meet its own internal needs. HP's corporate sales and marketing data is stored in a 500 GB data

## WORKFLOW GROWS

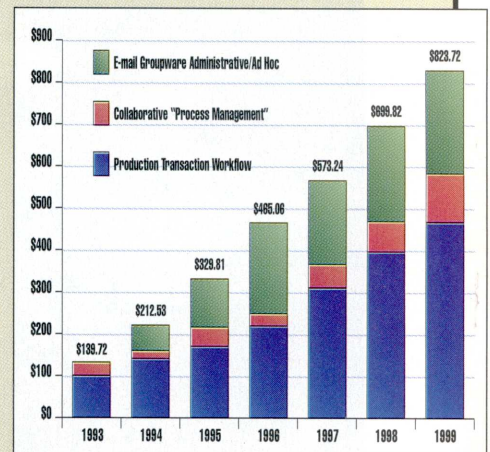
According to BIS Strategic Decisions (Norwell, Mass.), the worldwide market for workflow tools—development tools, workflow engines, databases and desktop runtime components—is projected to grow from \$213 million in 1994 to \$824 million in 1999.

Total value of workflow-enabled software (application software bundled

with workflow tools as part of a business application) as well as workflow tools (minus custom applications) will grow from \$580 million in 1994 to almost \$3 billion in 1999.

## THE INS AND OUTS OF IT

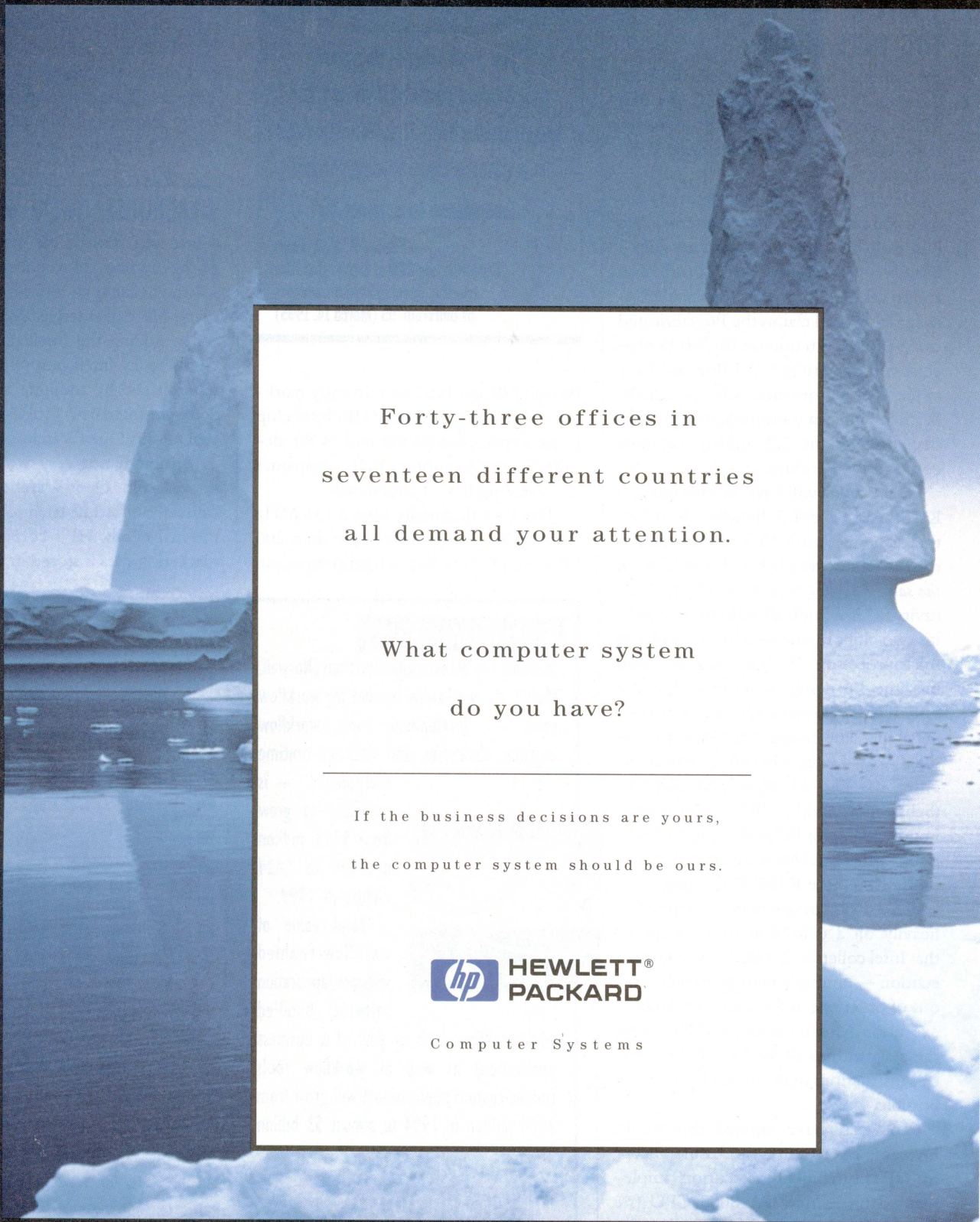
On average, companies have achieved a 9 percent cost savings and a 15 percent increase in capacity and quality through outsourcing, according to "The Outsourcing



Source: BIS Strategic Decisions

Institute Trends Report: Purchasing Dynamics, Expectations and Outcomes." Other findings include: short term benefits dominated as the reason for "unsuccessful" outsourcing efforts; outsourcing purchasers put pressure on vendors to shorten the entire outsourcing purchasing process; and a vendor's reputation, references and existing relationships were the most important factors when it comes to the vendor selection process.





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warehouse accessed by over 600 users. Part of HP's Mainframe Alternative Program, the OpenWarehouse is delivered under the auspices of HP's Professional Services Organization (PSO). Consequently, the OpenWarehouse Program was formerly only available to Fortune 500 companies managing large quantities of data and a large number of users.

General Electric, Mobil Oil and 7-11 are a few of the 100 companies that HP's PSO has helped with data warehousing projects. But with the enhancement of its services, HP is attempting to reach companies working with 15 to 25 GB of data and 20 to 35 users. Although costs vary depending on hardware and software configurations, pricing begins at

\$75,000 for small-scale installations. Costs for large-scale installations start at \$180,000 (105 GB of data and 400 users) and may cost up to \$1 million (3 TB of data and 2,500 users).

Within its OpenWarehouse Program, HP's IW is a collective set of middleware, administrative and end-user component tools — the IW Hub, IW Advisor and IW Administrator — that help IS managers manage data warehouses. For example, summary

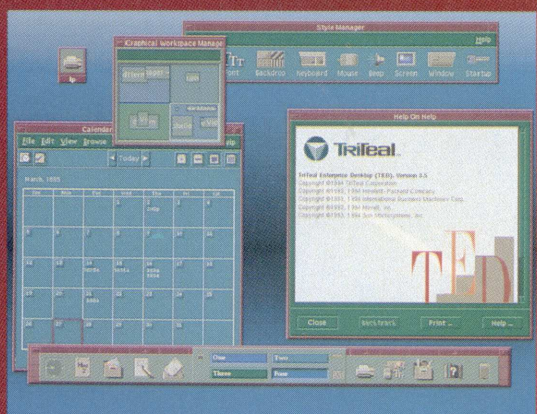
## (AND FEEL)

OK, Microsoft's got Bob. So what? If you haven't heard, Bob is Microsoft's new cartoon-based, consumer-friendly GUI. Well, the UNIX community, which once disdained GUIs as a matter of principle, now has TED. TED may not have any helpful cartoons named Bob or rats named Scuzz, but it does fulfill a long-standing wish for the UNIX community — a standard look and feel for all the various flavors of UNIX.

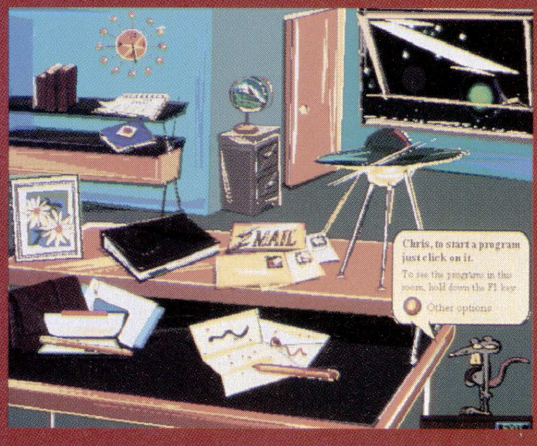
TED was introduced in mid-March at Uniform '95 by TriTeal Corp. (Carlsbad, Calif.). TED is an acronym for the TriTeal Enterprise Desktop, TriTeal's implementation of the OSF's Common Desktop Environment (CDE). CDE technology, the brainchild of HP, IBM, Novell and SunSoft, provides a consistent interface for all the different flavors of UNIX. HP-UX's Visual User Environment (VUE) is at the core the CDE specification.

HP will distribute TED, running as a local client on HP's X terminals, and the company also will act as an authorized reseller of TriTeal's host-based CDE software. All HP 700RX and later X-terminal models will support TED, according to David Werezack, X terminal product manager at HP's Panacom Division.

HP's new "p" Series X terminals have been shipping with CDE Lite, a local client implementation of the CDE window manager since their introduction in February 1995. Although not exactly the same as HP's VUE, "customers familiar with VUE will have an easy transition to CDE," says Werezack. "It will be very familiar."



*TED (shown above) doesn't come with any "rooms" like Microsoft's new "social interface" called Bob (shown below). But TED is a godsend for UNIX users.*



TED has the distinction of being the first CDE implementation to be run on multiple operating systems — HP-UX 9.x, IBM AIX 3.2.5, SGI Irix 5.3, Sun Solaris 2.3 and SunOS 4.13 — to be exact. Consequently, both VUE and CDE will be bundled with HP-UX 10.0, expected to be generally available by this summer. "VUE can be the default," says Buzz Walker, marketing program manager with HP's Open Systems Program. "We'll eventually

obsolete VUE, but not until all our customers make the transition successfully." Although plans haven't been finalized HP-UX 10.0 will provide administration tools to help with the VUE-to-CDE transition.

In its simplest terms, TED is to UNIX what Microsoft Windows is to MS-DOS. Only better, according to UNIXphiles. But while CDE unifies the UNIX desktop, it's hard to have a desktop strategy without addressing Windows, according to Greg Blatnick, vice-president of the X Business Group (Fremont, Calif.). "The CDE specification is vague when it comes to supporting Windows applications. Two to four years ago CDE would have been better received, but now there's 50 to 80 million Windows[-based] desktops out there."

But that's too broad a view for Walker. "We are not trying to replace PCs on the desktop." With

the workstation market growing at 25 percent a year and 2 million workstations expected to ship next year, Walker thinks there is plenty of growth. Nevertheless, the point Walker stresses "is that CDE is a common user interface for UNIX OSes. Application developers now have access to a standardized API layer; how you interface to it is exactly the same no matter what the platform."



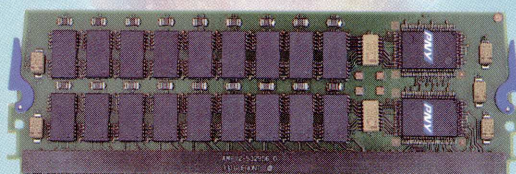
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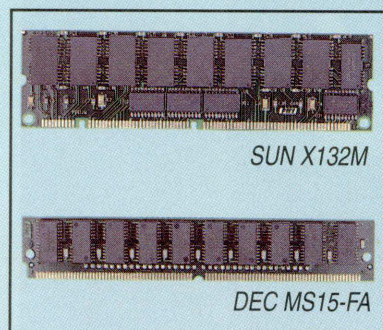
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level seeking, security, partition management, query blocking and business model views are provided. The IW tools also support drill across, external data integration, partitioning as well as OLAP (Online Analytical Processing) integration.

The IW Guide, HP's new enhancement, is a graphical end-user tool allowing a user to browse through the contents of a data warehouse to examine the precise definition of data elements. The IW Guide (like the other IW components) support most ODBC-compliant data access and report writing tools. But for server-based reporting, Software Interfaces ProReports 1.3 has been adopted and integrated into HP's IW.

With ProReports, the best of host-based (efficient processing) and PC-based reporting (assembling and formatting output) has been combined, according to George Ferguson, HP's OpenWarehouse program manager. Ferguson also notes that because you can do multiple queries from different databases (e.g., DB2, Oracle, Sybase) in a single report, ProReports

will provide a means to perform complex comparisons. "You can't do that with single SQL statement. ProReports also does not require the use of a separate data dictionary.

Software Interfaces' ProReports 1.3 is available now for Windows-based clients (\$695). UNIX Motif and Windows NT clients also will be forthcoming. The server portion (\$10,000) is now available for HP and Sun platforms, to be followed by NCR and IBM AIX. ●

## DOWN HOME PCS FROM HP?

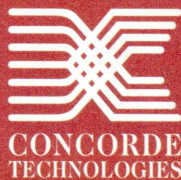
**B**y now, you've probably found HP PCs in places where you never expected — Circuit City retail outlets. That's because HP introduced three new Intel Pentium-based PCs for consumers during the first week in April.

The new home PCs, developed and marketed by HP's Home Products Division (HPD), were created to focus exclusively on the home consumer. "In the past two years, HP has emerged as the fastest-

growing PC vendor for the corporate market, says Webb McKinney, general manager of HP's HPD. "With an affordable, high-quality consumer PC line and strong retail programs, we have an opportunity to replicate that growth in the home market." The HPD also is responsible for developing and building television set top boxes for use in the interactive television market.

But don't confuse the generically named HP Multimedia PC Series with its Vectra line of business computers. They do not include business software, and they are not LAN configurable. For example, the 60, 75 and 90 MHz Pentium-based systems include WordPerfect Works, Quicken SE, Compton's Interactive Encyclopedia, and NCE and Reference, Microsoft Home CD Sampler and WordPerfect Wallobee Jack: Secret of the Sphinx. Buyers will have access to a toll-free, 7x24 phone support as well as online support through HP's support forum on America Online and CompuServe. ●

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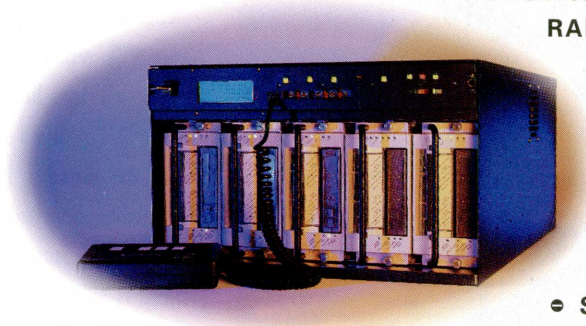
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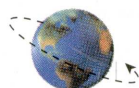


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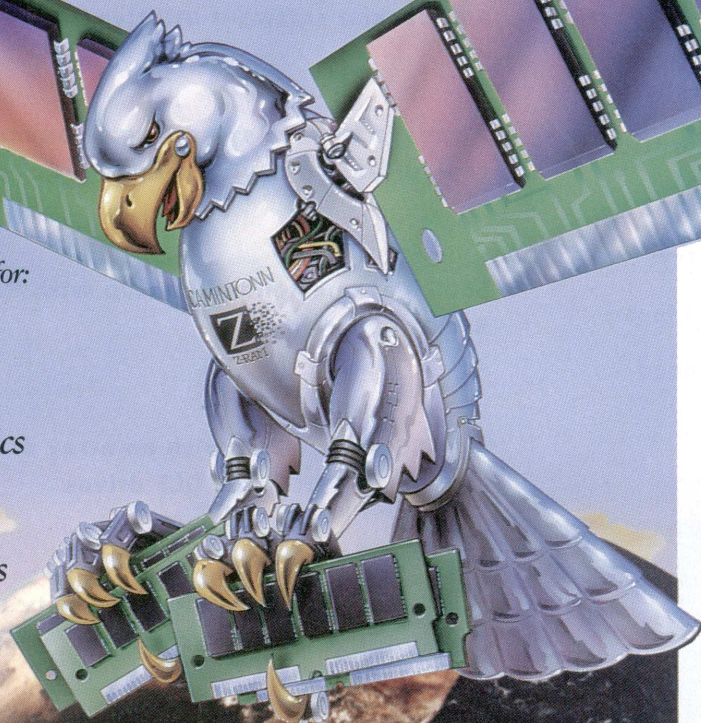
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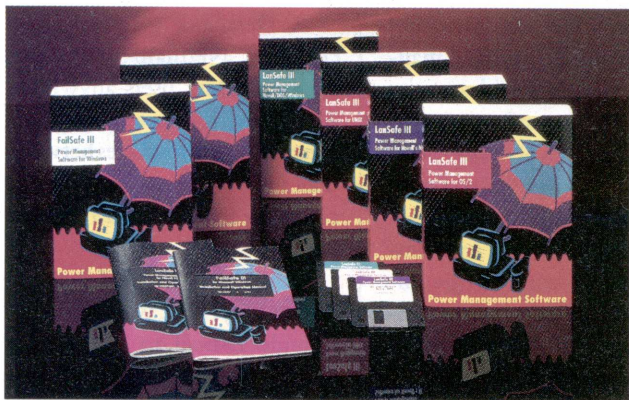


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# Blackout, But Not Blue With Deltec's LanSafe III



## LANSAFE III

- GUI- and character-based interfaces available
- Runs on Novell NetWare, Novell NMS, Windows, MS-DOS, UNIX and OS/2 (with LAN Server and LAN Manager)
- Price ranges from \$69 to \$149, depending on the platform

### Deltec Electronics Corp.

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**B**lackouts and shutdowns can tamper with, and even destroy, information. But with an Uninterruptible Power Supply (UPS), you needn't worry. "Our whole system went down when the power went out for five seconds, but with LanSafe III we could log in as soon as the power came back on. Without it, that never would have happened," says Kelly Winters, strategic accounts manager at Vaughan/Caudle Associates Inc. (Dallas, Texas).

Winter's sincerity stems from her history with Deltec's LanSafe Power Monitoring and Management Software. "We began using LanSafe three years ago and we are religious about using Deltec's product, she says. LanSafe III, from Deltec Electronics (San Diego, Calif.), together with

Deltec's FailSafe III, provides power management software for protecting networks and stand-alone PCs.

Deltec's PowerRite Pro, PowerWorks RS Series and UPS Code II compliant UPSs use control circuitry that monitors power conditions in real-time and provides control and diagnostic data to LanSafe III software through an RS-232 communications link. This software logs the time and description of impactive power fluctuations and prompts the user to save work-in-progress before the system shuts down.

Both LanSafe III and FailSafe III include Power Scope, a real-time graphic display of UPS input, output, load level, battery time and battery charge status. Power Log lets the administrator keep tabs on such events as utility power failure, UPS shutdown time and when the power has been resolved. Users also can use Power Log's messages to check current and historical power problems.

The Battery Management Log displays everything from the charging activity to the status of the battery. "It's great for a management strategy because the management option lets the administrator check LanSafe III's information and its stats on one console," explains Winters.

In an extended blackout, all work in progress is saved because

LanSafe III and FailSafe III provide for a safe and sequential shutdown. LanSafe III simultaneously tests all UPSs on the network, allowing for full support of multiple workstations, servers and bridges, and it provides remote control and power monitoring of any intelligent networked device connected to a Deltec UPS. FailSafe III provides protection for Windows and OS/2 systems with full power monitoring and UPS test functionality.

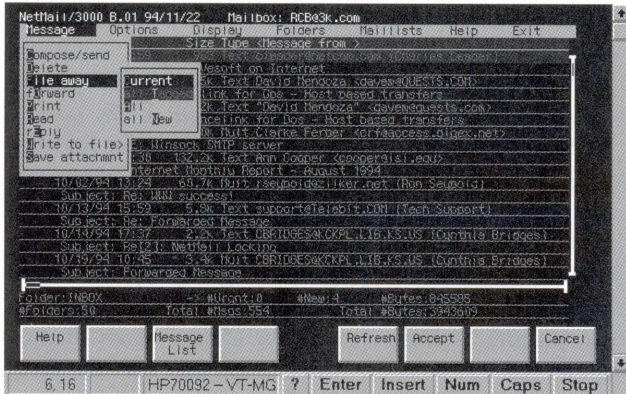
LanSafe III for UNIX allows users to interactively monitor and manage Deltec's UPSs under X Windows by using LanSafe's built-in GUI. For systems not running X Windows, LanSafe III includes a character-based interface.

LanSafe III for Novell, Windows and DOS, and LanSafe III for OS/2 with LAN Server and LAN Manager cost \$99. LanSafe for Novell NMS costs \$149. LanSafe III for UNIX systems (HP-UX, IBM AIX, Interactive UNIX, SCO UNIX, SunOS, Solaris and UnixWare) is \$149 on CD and 3.5-inch disks. LanSafe III for UNIX also is available on 4mm DAT and QIC tapes for \$199. FailSafe III for OS/2 costs \$89, while Windows and DOS version lists for \$69.

—Cindy Marone,  
Editorial Intern



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E-mail seems to have become one of those technologies that businesses just can't live without anymore, regardless of the type of computer system they have running. So for small and large corporations relying on the HP 3000 for their business-critical operations, Netmail/3000 from 3k Associates (Springfield, Va.) provides an MPE-based mail system that handles Internet mail without any external gateway and has a window-based point-and-shoot interface that operates on terminals and PCs.

Netmail/3000 uses no special hardware or software, needing only an HP-standard LAN card and commonplace HP LANlink networking software to make its connections.

A centralized administration facility includes automatic mailbox setup and a link with security packages that use information in security files from Security/3000 and USS/Security Plus to create mailboxes.

Netmail/3000 uses a streamlined terminal-window graphical interface to help connect users throughout all levels of an enterprise, as well as let companies expand the reach of their communications network by tapping the resources of the Internet. Administrators also can improve the effectiveness of their network communication by letting users attach spreadsheet and formatted document files, for example, to mail messages, which can then be sent to any Internet address in the world via the Internet's MIME multimedia protocol.

Graphic files, video, audio instructions or executable fields are automatically extracted by Netmail/3000 when a user reads a message. And users who connect through WRQ's Reflection package can have these multimedia files automatically launched by programs such as Microsoft Excel. Netmail/3000 also works alongside non-HP E-mail systems, easily passing messages from other SMTP-compliant systems on UNIX servers as well as PC-based packages such as cc:Mail and Microsoft Mail.

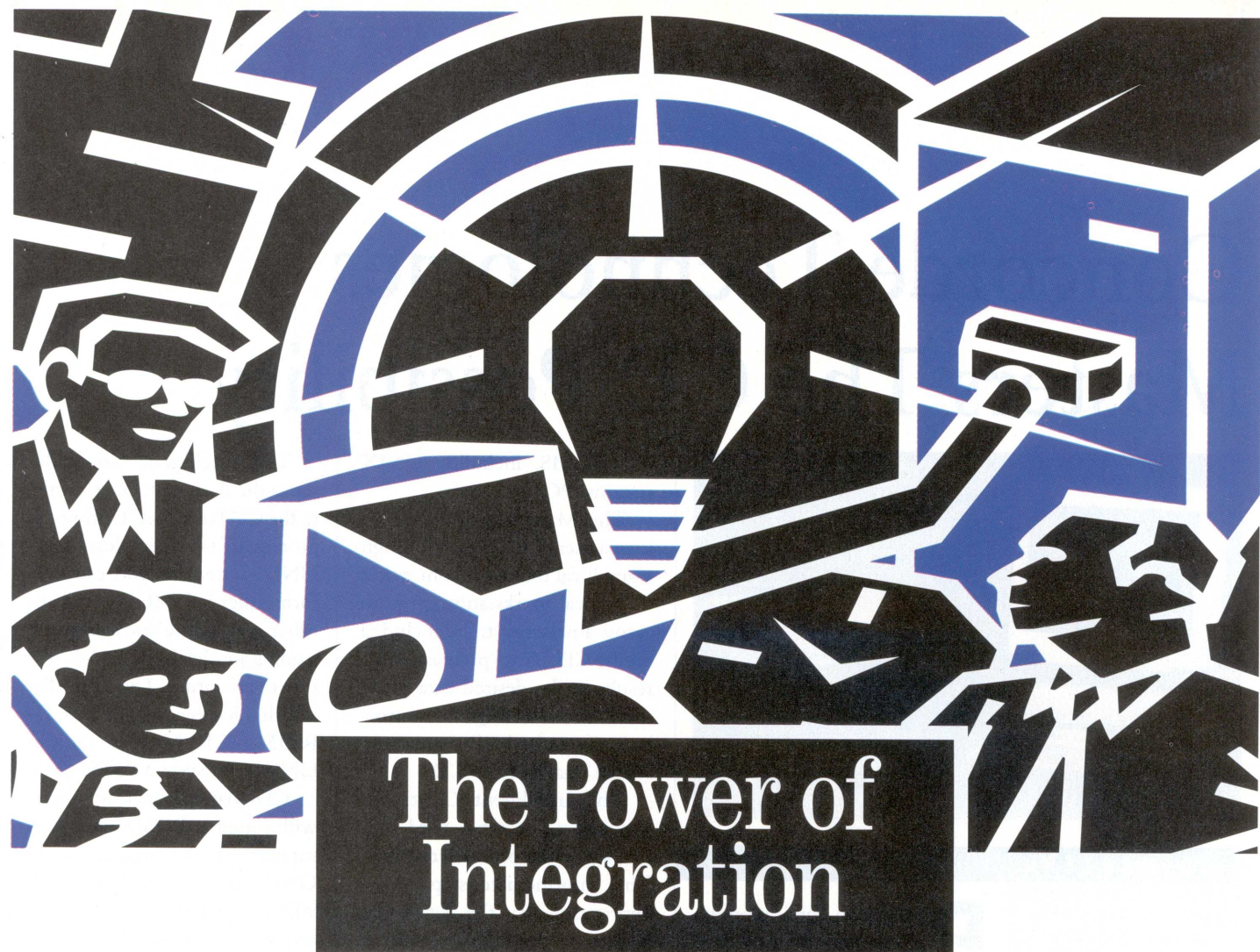
A DeskLink gateway easily connects Netmail/3000 users with HP Desk users anywhere. An automatic directory synchronization routes messages between mail networks seamlessly by exchanging mailbox and recipient data.

In 1993, the Public Library in Kansas City, Kan. was looking to provide E-mail to all of their employees on an HP 3000 system that already was running HP Desk. According to Cynthia Bridges-Fowler, computer systems supervisor, there weren't a lot of options out there. "[Netmail/3000] allows us to keep E-mail on the host and give everyone access to it, without making many changes to our existing system."

In early 1994, they decided on Netmail/3000 because of its cost and expandability. "We looked at getting an unlimited user license for HP Desk, but it was too cost prohibitive," Bridges-Fowler says. Priced at \$4,995, Netmail/3000 is sold with an unlimited number of mailboxes which allows companies to make a one-time investment that can handle future company growth.

—Deborah Schwartz,  
Assistant Editor





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CIRCLE 354 ON READER CARD

**P**hil Brown, application engineer with the U.S. Department of Defense (DoD), needed to capture intelligence information in the form of full-motion video and disperse it to multiple offices across the country. The DoD is deriving sensitive and costly data. "We need to see it the way we capture it," Brown says. So, about eight months ago, he turned to Concorde Technologies Inc. (San Diego, Calif.), a company who had provided the DoD with computing solutions in the past, and CD-Master, a solution for creating CD-ROMs on UNIX systems.

The three primary parts of CD-Master are: the Mastering Software, the Intelligent Controller and the CD Recorder. It produces CDs with industry-standard file systems that are readable by any system that supports

CD-ROMS, including UNIX systems, PCs and Macs.

The Mastering Software allows a user to select data through a graphical interface from either their local workstation or from across a network to be included on the CD. This "premastering" results in the desired data being sorted to the Intelligent Controller in a standard CD format as a virtual image of the CD.

The Intelligent Controller contains an internal hard disk that stores the premastered data. This intermediate step allows verification that the data to be written to the CD Recorder is correct prior to producing a CD. When the premastered image is ready, the Mastering Software is used to initiate the "mastering" procedure. The Intelligent Controller sends its data to the CD Recorder off-line from the host system on a separate SCSI interface. This allows data to be written without interruptions, at a specific data rate, which is required for error free production.

CD-Master Intelligent Controller connects to the UNIX system through a SCSI interface. However, it does not require a dedicated SCSI port. If you already have SCSI devices connected to the SCSI port, you can daisy-chain the Intelligent Controller. You also can daisy-chain multiple CD-Master systems providing simultaneous recording ability for multiple CD-R discs.

The Intelligent Controller sends the data, a block at a time, to the CD Recorder. During this process, CD-Master releases your UNIX system so you can perform other tasks. Recording another copy of the disc is as easy as loading another blank CD-R disc into the recorder. The controller also duplicates copies of the CD-ROM. CD-Master creates UNIX File System (UFS) discs.

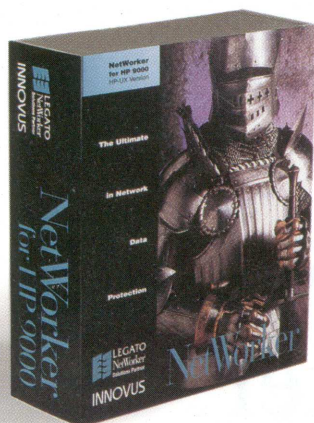
CD-Master is standards-based with complete POSIX file system support. It also supports most UNIX platforms including HP 9000, Sun, IBM RS/6000, DEC and Silicon Graphics. The DoD is using HP 9000 Model 755s as capturing and mastering stations that are linked to a LAN with HP 9000 Series 800 servers, Silicon Graphics systems used for analysis and display, and Sun workstations. The data is captured via video boards in the Model 755s and then compressed using MPEG and JPEG compression techniques. Then, the mastering unit creates a CD-ROM which can be sent around to various departments. The DoD currently has two CD-Master systems up and running, one on its way and have plans to get more later in 1995.

A double-speed CD recorder, costs \$14,995. A quad-speed CD recorder costs \$16,995, and a six-times speed CD recorder costs \$39,995.

—Deborah Schwartz,  
Assistant Editor



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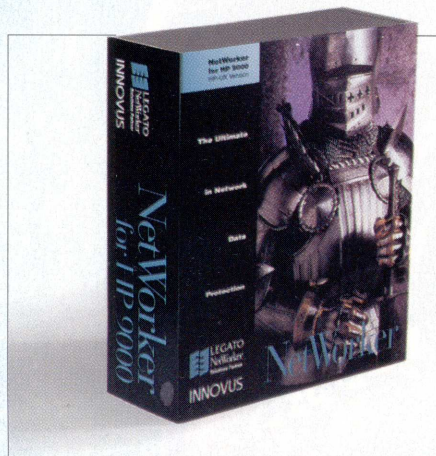
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CIRCLE 167 ON READER CARD



# Don't Start, Until You Backup With Innovus' NetWorker



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- Online index tracks the contents of any directory, file system or machine at a specific point in time
- Price ranges from \$2,000 to \$5,000 for the v4.02 server packages

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CIRCLE 352 ON READER CARD

Innovus Technologies' (Hamilton, Ontario) NetWorker can backup multiple servers from UNIX vendors, PCs, and NetWare 3.1x or 4.0x file servers.

Kevin Cantoni, manager of UNIX Support at Quantum Disk Drives (Milpitas, Calif.), uses NetWorker in a networked environment containing 125 workstations — mostly a mix of HP 9000 Series 700s plus a few HP 9000 Series 400s and Sun models. With over 100 workstations, the traditional UNIX backup/restore utilities like **dump** and **tar** weren't getting the job done efficiently.

According to Cantoni, "since upgrading to version 4.02, NetWorker has been very stable. It's helped us out most with full incremental backups." Quantum

actually had more problems with the physical media units themselves than with the software. "If there's any 'gotchas' in all this, that's where it's going to happen, with the physical media units, not the backup software," says Cantoni.

NetWorker was developed four years ago by Legato for Sun, SCO, RS/6000 and NetWare platforms. Innovus has the worldwide exclusive rights for porting and marketing the software to the HP environment. According to Mark Broadus, channel marketing manager at Innovus, "All the NetWorker products retain a family resemblance no matter which OEMs they've been developed by, because Legato has a requirement on interoperability, which insures that our server can use any clients that are created for any other version of NetWorker." Because Legato's interoperability scheme remains in place, you could have RS/6000 and HP server versions on the same network, manage both from an HP workstation and cross tapes between servers.

While most of Innovus' customers are using HP 9000 Series 700 and 800 systems, "virtually all of them have some non-HP equipment on the network. We're seeing about 75 percent of sales going out to support some kind of autoloader," says Broadus. The greatest number they sold have been with the HP auto-

loader. HP's Series 6400 Model 48AL DAT Autoloader comes bundled with a customized version of NetWorker. "That version supports only one autoloader, but if you bought NetWorker off our standard price list, it would support any autoloader that we [Innovus] support," points out Broadus.

NetWorker provides a scheduling interface that defaults to weekly full backups and daily incremental backups. The software can handle backups of live applications via application specific modules. An online index tracks the precise contents of any directory, file system or machine at a specific point in time. NetWorker also uses tape positioning commands to move past bad spots on a tape. Data is recorded on a file-by-file basis, so the loss of tape position means, at worst, the loss of individual files, not the data structures themselves.

First released in December 1993 to the midrange UNIX backup market, NetWorker requires HP-UX 9.01 or higher (Series 700), or HP-UX 9.04 or higher (Series 800), and an HP-supported backup device. Price ranges from \$2,000 to \$5,000 for the v4.02 server packages. Add-on modules are extra. An evaluation kit is available for \$50.

—Jim Esch,  
Contributing Author



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# Tryonics Reconstructs Service Offerings



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Program Manager  
Tryonics Inc.

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CIRCLE 351 ON READER CARD

**A**lthough its customer base has grown, Netrix Corp. (Herndon, Va.), a value-added reseller of HP/Apollo Domain workstations to the telecommunications and networking marketplace, remains a small company. At first, Netrix bought workstations direct from HP at list price. But with its small volume orders, it was difficult to get anyone at HP to take an order. "With only five new customers a quarter, we still needed product. It was frustrating," says Debbie Walker, senior buyer.

A temporary solution called for buying workstations from a distributor. "That helped us because we got a discount; the distributor was larger than we were, so they could get product faster," she says. But the distributor solution was short lived. No sooner had Netrix begun buying workstations from the distributor, HP announced the discontinuation of the Apollo Domain architecture — Netrix's platform of choice. "We were in trouble," Walker remembers thinking. "It meant a migration to HP-UX and, of course, with all of our customers for 10 years working on Domain, we would have to migrate them."

But Walker happened to see an ad for Tryonics Inc. (Portsmouth, N.H.), a reseller of remanufactured HP/Apollo products. "They came down and did a presentation for us." Since then, Netrix buys all of

their workstations from Tryonics, which specializes in the Apollo DN series and HP 9000 Series 400 and 700 systems. The products come from manufacturers' excess inventory and from user organizations that are upgrading or changing platforms. Tryonics has been ISO 9002 certified since 1993.

Tryonics refurbishes equipment to the point where "it's difficult to tell them from a new product," says Richard Gurecki, Tryonics' program manager. "We don't cut corners. We supply the documentation and follow the manufacturer's packaging specs. If something's not up to par, a keyboard or mouse, we provide replacements." Tryonics offers them for 50 percent to 75 percent discount from the list price.

Tryonics has solved more than one problem for Netrix. First, the cost of workstations has improved. "Because we're getting remanufactured systems, that cuts a lot off our price," Walker says. Second, the quality of the hardware is high. "We're small but picky." Walker reports that there have been no problems.

Founded three years ago, Tryonics has tapped into a steady demand for older HP and Apollo systems. In the future, Tryonics expects to add Sun, DEC, SGI and IBM systems as well. According to Gurecki, "Our customers are people who usually have dedicated applications and

are expanding, or just want to add a few seats or need memory upgrades or parts."

The supply of Domain workstations is adequate for Netrix's needs. According to Walker, "Eventually we'll have to migrate our customers, but we have no product problems now. Tryonics has done a terrific job."

In addition to remanufacturing, Tryonics has expanded into two new areas: full asset management services and software application sales. Asset management, says Gurecki, is an extension of the remanufacturing business. "We provide customers with a means of handling excess or obsolete computer equipment. We bid on anything that can be refurbished. What's left is disposed of in a safe manner."

Also, Tryonics provides trade-in and trade-up programs and consignment returns. The customer maximizes the return through better turnaround and reduced cost, according to Gurecki.

In the software services area, Tryonics has become a value-added reseller of Appgen, a UNIX business and financial package from Appgen Business Software (Bohemia, N.Y.). It's a first for Tryonics, "but we're going to be adding other software packages and services during 1995," predicts Gurecki.

—Sam Dickey,  
Contributing Author



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1	1	1	Number Non Productive	-78.01
1	1	1	Total Headcount	0.00
1	1	1	Management Salary	0.00
1	1	1	Team Leaders Salary	0.00
1	1	1	Non Productive Salary	0.00
1	1	1	Non Productive Overtime	0.00
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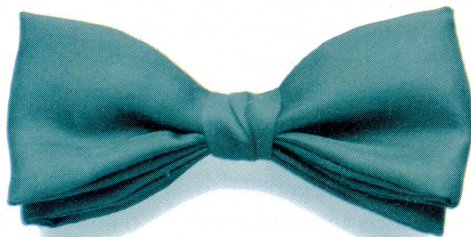
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CIRCLE 224 ON READER CARD



# RAD ROUNDED UP

**RAD is a psychological approach.** "Rapid Application Development (RAD) is not just a methodology for managing the development life cycle," says Peter Barber, managing director of Sapiens USA (Durham, N.C.). "We've found that the major challenge in RAD is managing the human process."

According to Barber, focus groups formalized as a series of meetings for the development team and the end users become a framework for cooperation and joint application development. Categorizing focus group input from the end users answers a number of development team questions, such as: Is it time to stop iterating? Are these end users the right end users? Do they understand the application or not? "With our RAD approach," says Barber, "the end users own the application when it goes live, because they actually created it."

**RAD is visual development.** Nowadays, nearly every product that calls itself a RAD tool has a graphical user interface (GUI) builder. Win-

dows and graphic control elements like buttons and sliders are associated with the ability to develop applications easily and quickly. "A lot of first generation tools have no notion of a separate process capability in the product," says John Treacy, vice president of product marketing for Dynasty Technology Inc. (Naperville, Ill.), "A business rule, for example, attached to a button on the client window will be a maintenance nightmare if you have hundreds or thousands of users to satisfy. It's really the technology underneath the obvious window painting tool that provides the actual RAD gain."

**RAD is object-oriented (OO) development.** Objects are small, reusable software components — independent capsules of code with distinct functions. Object technology — the creation and manipulation of objects — speeds up application development because objects can be stored, modified and reused. "One of the most important aspects of RAD," says Jim Laurie, senior manager of IS services for Western Digital (Mountain View, Calif.), "is an object-oriented approach with the objects in a shared repository. The Forte environment from Forte Software [Oakland, Calif.] helped us learn how to do things in an object-oriented way."

**RAD is 4GL-based development.** ObjectPro from Trinzic Corp. (Palo Alto, Calif.) is a development system that enforces the rigor of an OO paradigm during development while hiding its complexity, says Nancy Wood, Trinzic's technical services manager for business development. When you're programming in ObjectPro, the language looks very

JUDITH  
HARPER

## A Down And Dirty Tour Of The Fast-Paced World Of Rapid Application Development



"4GLish," according to Wood. "You have to create classes. You have to create methods. So before you know it, you're working within the OO paradigm."

#### ***RAD is cross-platform development.***

When Adage Systems (Westport, Conn.) set out to develop a new enterprise-wide planning system for its clients, they went looking for a development environment with a GUI, an OO development tool and a database engine, says Wajih Ireifej, Adage's technical support manager. "The only product that fit that (profile) was the Ingres Windows 4GL tool (now CA-OpenRoad)."

Computer Associates' (CA; Islandia, N.Y.) CA-OpenRoad is an OO, multiplatform application development product that integrates very tightly with relational databases, but remains database independent. "The exact same OpenRoad source code works with Oracle, Sybase and Ingres," says Marc Sokol, vice president of product strategy at CA. "The whole thing about object management is allowing these various systems to talk to each other."

#### **RAD To COBOL CONVERSIONS**

DESPITE THE growth of client-server and distributed computing, over 2 million programmers list COBOL as their primary programming language. "There are millions of lines of COBOL code out in corporate user environments," says Kipp Martell, director of corporate communications for Acucobol Inc. (San Diego, Calif.) "People are spending about \$40,000 (a year) on maintenance alone for the COBOL in these systems."

Because COBOL applications and legacy databases such as VSAM are not readily accessible to workstations in a client-server environment, "people are really struggling with how to get everything converted to new technology," says Vicki Duckworth, director of services marketing for Cincom Systems (Cincinnati, Ohio).

Cincom Systems markets FASTFORWARD, an automated software and ser-

vices offering that migrates COBOL applications from legacy databases to an open systems environment that supports Cincom's Supra Server SQL and other ANSI-standard SQL relational database management systems like Oracle, Sybase and DB/2.

Acucobol Inc. markets a line of products designed to modernize legacy CO-

BOL. They are: Acucobol-85, an ANSI-85 COBOL compiler; Acu4GL, a seamless COBOL to RDBMS interface; and AcuServer, a network file system support for Acucobol applications running on UNIX and DOS TCP/IP networks. The three work together to integrate COBOL applications into client-server networks. "People come to us when they discover

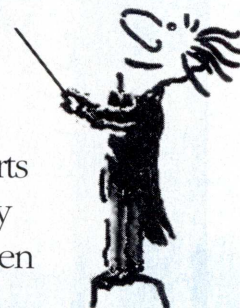
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that a re-engineering effort (to upgrade their COBOL applications) will take two to three years," says Martell. "We can re-host and migrate their code to the new platform in two to three months."

Relativity Inc. (an Austin, Texas division of Liant Corp.) also provides a middleware product that allows any Windows front-end tool with an ODBC interface to access the data in COBOL databases transparently to the user.

### DATA ACCESS

ENTERPRISE-WIDE data (business information, processes and rules) is often stored on mainframes or minicomputers in relational databases. RAD tools based on object technology can develop linkages between legacy relational data and new OO applications.

"People want to start building object applications to get the modularity and

distribution of client-server, but still talk to their relational legacy systems," says Christopher Keene, president of Persistence Software (San Mateo, Calif.).

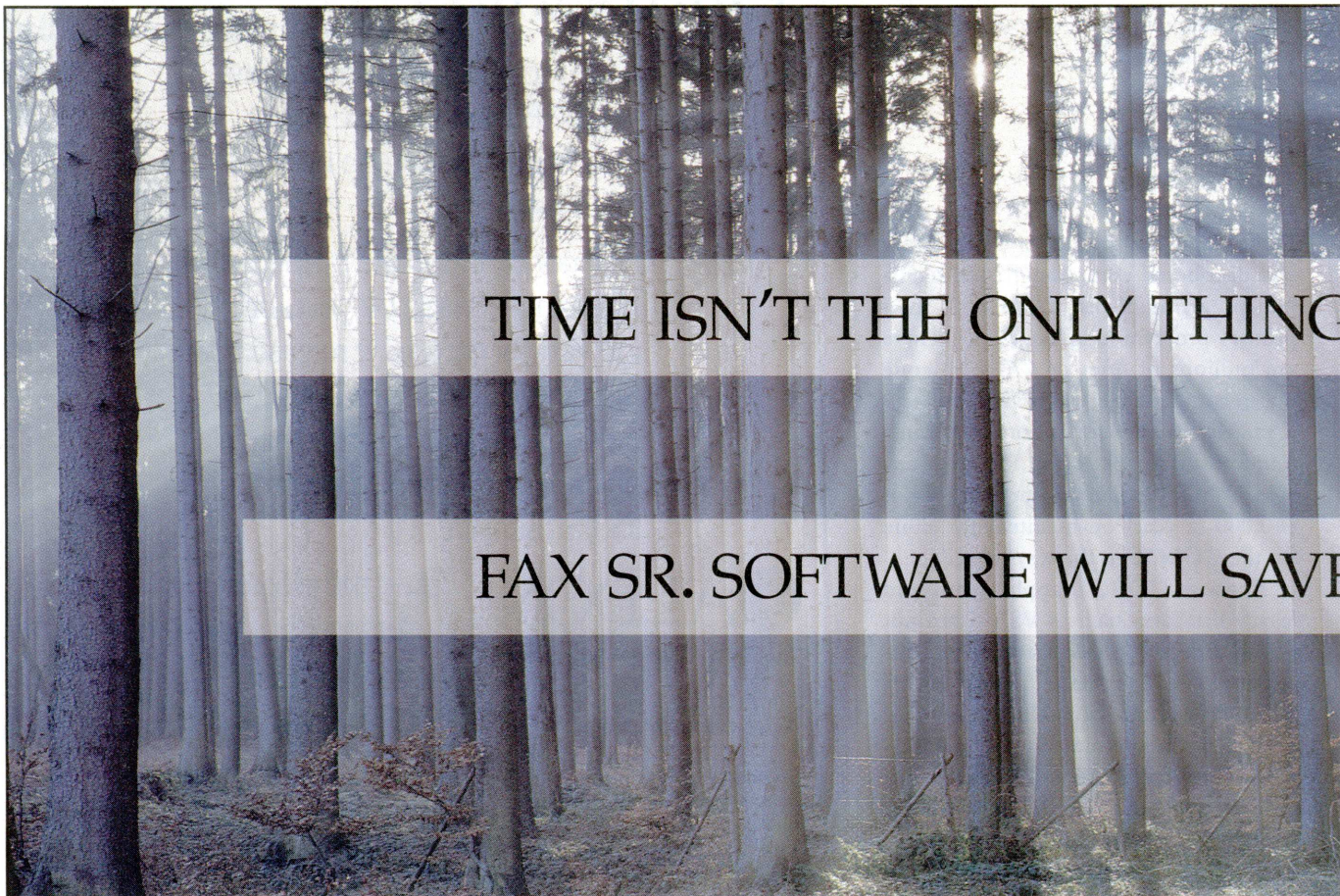
Persistence is an automated link-builder that comes in two parts: the Relational Interface Generator (RIG) converts object models into C++ classes, and the Relational Object Manager (ROM) maps relational data (from Oracle, Informix, Ingres or Sybase) against business objects to produce a database-independent set of reusable objects. The ROM runs under Microsoft Windows 3.1, SunOS, Solaris, HP-UX and NeXTStep. The Persistence RIG automatically generates relational database links on Sun or HP workstations, and C++ classes that are generated are fully portable across UNIX and Windows environments.

HP's Oadapter also is an RDBMS-ODBMS link builder. It automatically maps and converts Oracle7 or ALLBASE/SQL databases to an OO language and de-

velopment environment. "By layering Oadapter on Oracle," says Douglas Dedo, marketing manager for HP's Object Access Program, "we take advantage of all the development work that Oracle has put into their database, all the security, reliability, integrity and distributed functionality."

"The ability to retrieve, modify or reuse sections of code is a very powerful way to cut down on the amount of work developers have to do," continues Dedo. Oadapter runs on HP and Sun (both client and server). The client software also runs on RS/6000 under AIX and on PCs running Windows 3.1, Windows NT or OS/2.

Natural Tools from Software AG (Reston, Va.) is another RAD object-link builder. "We see our customers using HP machines for extracting legacy data from the host and putting it onto UNIX boxes as data servers," says Scott Billings, marketing director for application engineering technology, "Esperant,





our end-user retrieval tool, recognizes data that belongs together like an object. It gives users access to the objects through SQL queries."

### THE GOOD, THE RAD AND THE UGLY

"WHEN YOU USE RAD," says Steve Manson, director of product marketing for Cadre Technologies (Providence, R.I.), "you get a lot of product improvement, but you can quickly create a mess. So you need to step back and analyze the system before you proceed. Then, if you want to go into rapid application development, you know you're going to build something useful."

Cadre Technologies markets ObjectTeam, an umbrella family of application development products; Ensemble, a reverse-engineering tool that demystifies legacy C code; and ObjectTeam Pro-

Dev, an environment for C++ programming. ObjectTeam comes in two flavors: ObjectTeam for Shlaer-Mellor supports critical technical projects requiring a rigorous methodology and a high level of detail. ObjectTeam for Rumbaugh, lighter and more flexible than Shlaer-Mellor, is used more for smaller commercial projects.

To use Cadre tools to develop a replacement system, says Manson, "let Ensemble take the existing C applications and reverse-engineer them into a form that is easy to understand. Then, using either ObjectTeam Shlaer-Mellor or ObjectTeam Rumbaugh, model the proposed new system from scratch, taking into account the knowledge you gained using Ensemble. Finally, generate your new application."

CorVision from the International Software Group (Waltham, Mass.) is an application generator built around an OO repository that carries four kinds of

information: a data dictionary; descriptions of the relationships between data in different databases; business rules, computations and process-defining algorithms; and the underlying definitions and structure of the user interface. Through the repository, you can access code, even update functions, from the legacy application without using the 3GL or 4GL legacy application tool.

As users require more data faster, application developers can no longer rely on the traditional waterfall development methodology, because of the long cycle time and large-scale development effort required.

"There's a continuum that spans all the way from let's knock this out in a hurry and deploy it ASAP, to let's take a little more time and make sure that this application adheres to our business processes and our information system infrastructure," maintains Johnny Long, director of technology for Composer,

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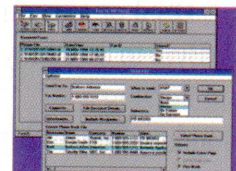
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Texas Instruments' (Plano, Texas) application development tool.

At the "ASAP end" of the continuum are applications that have a "very tight window of opportunity. That means, if you take too long, there's no reason to do them, because you've missed the window. When the window has come and gone, the application dies." If you're working with an "ASAP" application, you're less concerned about analysis and design.

Applications that will have a longer life span take a little more time. "You don't want analysis-paralysis," says Long, "but you do want to be sure the application follows your business processes and has consistent implementation of your business rules." — *Judith Harper is a freelance writer based in Cincinnati, Ohio. She can be reached at 70754.3452@compuserve.com.*

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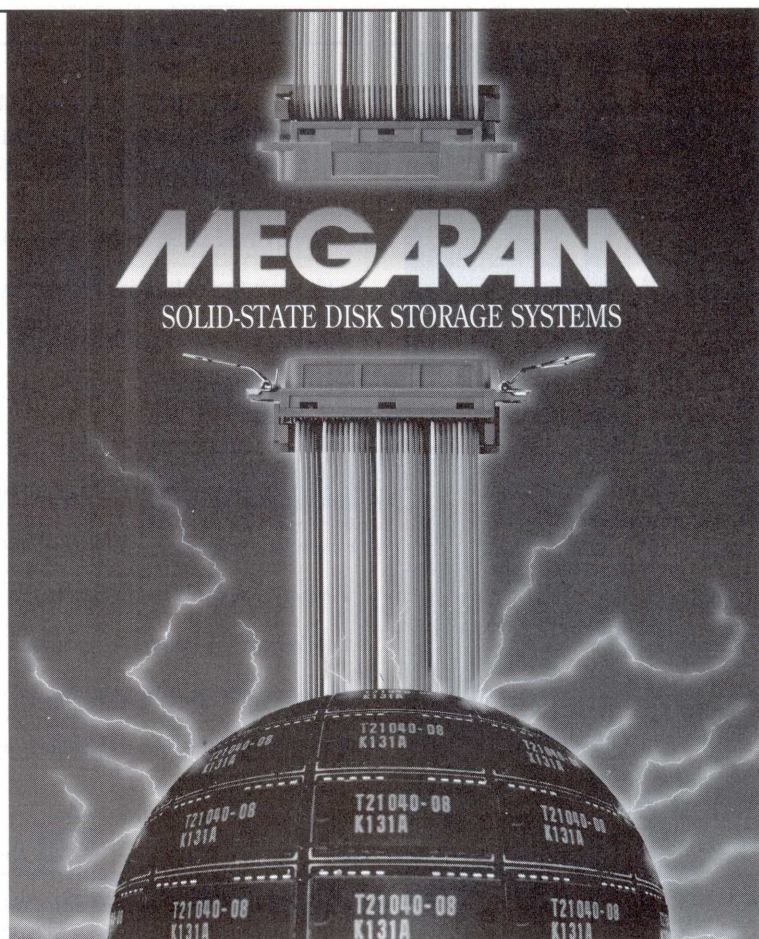
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# House Of bugg'in'

Richard Riehle

**Studies of software** complexity tell us what we already intuitively suspect: complex software code has a higher defect density. To wit, the \$4.2 billion Denver International Airport (DIA) finally opened for business this past February 28 — 16 months late and several billion dollars over budget. Problems with the software for the baggage claim transport system helped to delay the official opening that was originally scheduled for October 1993.

Bags were routed to the wrong terminals and sent flying (without ever getting on the airplane) across the concourse. According to reports, a manual backup system had to be built as a fail-safe measure. Amusing perhaps, but billions of taxpayer dollars and valuable time were wasted because the software for the baggage system wasn't tested until it was too late. Unfortunately, the DIA's troubles may not be behind it.

A new \$140 million terminal at Colorado Springs Airport that was built on time and on budget stands to benefit. According to *Forbes* magazine, a recent study predicts a 7 percent gain in Colorado Springs' traffic directly because of Denver International. One of the reasons given is that the cost overruns at

the DIA will result in higher ticket prices.

The well-publicized DIA fiasco demonstrates a valuable lesson for all software developers. Execution is the wrong stage in the software life cycle to find mistakes. Too often, testing is relegated to an end-of-project task. BAE Automated Systems Inc. (Carrollton, Texas), the integrators for the baggage handling project found out the hard way that testing should be included in the project design as an integral part of the entire software product life cycle.

For example, on the Apollo Space program, 80 percent of the software development effort was devoted to testing. The result: an astonishing 0.1 failure rate per thousand lines of source code (KLOSC). Certainly, any safety-sensitive software project must be subjected to the most rigorous testing, regardless of its size.

Of course, any important software product must be tested as well. But manual testing, unless it is on a very small scale, just can't be justified. That's where automated software testing tools can make a difference. In fact, the Institute of Electrical and Electronic Engineers (IEEE) considers the use of an automated software tool to be indicative of an improvement in the software development process.

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The questions then become how much testing is necessary, and when do manual methods become unmanageable given the size of the project and level of required quality? Obviously, high-risk software should be tested more fully than low-risk software.

## LIKE A BOX OF CHOCOLATES

BECAUSE THE correction of one mistake tends to propagate new mistakes (better known as the "law of unintended consequences"), be sure to consider "regression" testing as part of the testing process. After correcting a mistake, you need to ask: "Did the correction work? Was anything left out? Was it applied every place it should have been?"

But the most important question is: "Did something else break?" In other words, you never know what your going to get. A good automated testing tool

## THE BUG STOPS HERE

Use the term "mistake" rather than "bug" when a software defect causes a failure. "Bug" is too often used by software developers to abdicate their responsibility as makers of mistakes. Bug fixes are only 50 percent successful (on average). The rest of the time they either don't fix the problem or introduce errors in other sections of the application.

**Defect** = something that causes incorrect software behavior.

**Defect density** = a measure of defects per unit of source code.

**Mistake** = something that causes a defect.

**Bug** = something that enters a program from an external source (such as cosmic radiation), but was not written as part of the source code.

will help you identify where to apply regression testing. It also will produce reports and historical information regarding previous tests so you can spot trends. Sometimes, a particular error re-occurs regardless of what kind of repair you do. You can use that information to isolate the code for that error, create a new module and localize the effect of the error, wherever possible. According to the Gartner Group (Stamford, Conn.), only 25 percent of application development organizations perform regression testing, despite a 50 percent chance that a modification to an individual program module will cause yet another defect (not "bug"; see "The Bug Stops Here" sidebar) in the application.

Although the the cost of regression testing on every repair often comes under the suspicion of bean-counters, if you eliminate regression testing from your testing cycle, expect the cost of the total life cycle to increase. You should

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## FEATURES TO CONSIDER WHEN LOOKING FOR AN AUTOMATED TESTING TOOL

- **Ease of use.** Is the tool consistent, and is recovery from user errors easy to do? Do you require a multiuser tool? Can you disable unwanted features? It's more than just a standard user interface.
- **Power.** Does the tool support the creation of templates? Can templates be inherited from existing templates? Are existing commands sufficient to do the job? Can you add new commands? The tool should keep track of what it is doing, what it has done and learn to do more.
- **Reliability & Performance.** Is the tool fault tolerant? Expect the same (or better) reliability from a testing tool that your customer expects of your delivered software. Not all testing tools have been subjected to the same level of testing you might apply to your software. The test tool developer may not have done enough testing.
- **Functionality.** Does this testing tool correspond to your software process standards? If you are using Object Modeling Technique (OMT), does this testing tool match that method? Maybe you are using Jackson System Development (JSD), and this tool has no knowledge of data-structure-oriented design.
- **Appropriateness.** Will it require changes to the way you do things? Are those changes acceptable? Is it easy for your staff to learn the new tool in time to use it? If you are using a CASE tool, will the testing tool be a good fit for that tool? Whether a specified software test tool is correct for your environment is often overlooked.

- **Vendor Support.** Can you get the kind of support you need from the testing tool supplier? This includes training, helpdesk, online inquiry, timely issuing of new releases and even user forums (electronic or in-person). User groups or independently published vendor-specific magazines are good ways to learn information the vendor may de-emphasize.
- **Security.** Does this testing tool permit the tester to bypass standard security features? Some software contains sensitive financial, competitive or personal information.
- **Capture/Replay Facilities.** Is there a scripting tool? Capture and replay facilities in a testing tool can save a lot of time over the software life cycle. The capture process remembers everything that happened in each testing cycle. The file containing the captured information can be modified to permit a new set of tests. That modified file is then played back to try a new set of tests. This can continue for the life of the software.
- **Coverage/Frequency Analyzer Tools.** Although this can be a costly process, it is well worth it for critical software products. Branch analyzers will even test null ("else" conditions) in your software. Path analyzers will include cumulative information about multiple passes over a set of iterations and conditions. Some tools will report information on module execution. Coverage and frequency analyzers are well-represented by HP's Basis Branch Analyzer. — RR

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never introduce a change and then test only the "affected section."

Performing a manual regression test is impossible. The tester is five times more likely to cause the regression test to fail than they are to cause the application to fail.

Unfortunately, most automated test-

ing tools focus on only part of the testing process, not the entire testing strategy. It is rare for an automated tool to assist with the test plan. However, automated tools from Pure Software (Sunnyvale, Calif.) include a comprehensive model for a test plan.

Better CASE tools now include some support for software testing. But CASE tools, in general, do not enforce test plan development. In fact, until recently, few CASE tools integrated any significant automated testing tools into their products. This increased availability of testing features is user-driven. Experienced software developers are demanding "complete" CASE tools, which include software testing capabilities.

## SELECTING THE RIGHT CONFIGURATION MANAGEMENT TOOLS

"As more and more enterprise applications are developed on open systems platforms, these main-frame disciplines will become essential on UNIX platforms, especially when client-server applications are rolled out to scores of servers and hundreds or thousands of clients." —Paul Mason, Senior Analyst, International Data Corp. (Framingham, Mass.)

As a result of this significant trend, software developers are now looking for process configuration management (CM) tools. With so many options available in the marketplace today, it is sometimes difficult to choose the right tool.

1. Pick a tool that will accommodate your platform today and tomorrow. Vendors that offer the widest scope of tools can provide safeguards in case you expand your platforms.
  2. Demand complete support of tool integration. Does your vendor have a published API? This is especially important if you decide to customize and integrate your process configuration management tool with current frameworks such as Tooltalk, SoftBench and Cohesion. Integration with groupware packages such as Lotus Notes is becoming important.
  3. Inquire about ease of use. GUI and command line interfaces are essential. Character-based form front-ends are especially helpful for shops that must support character-based terminals.
  4. Watch for flexibility/adaptability. The tool must adapt to your engineering process. Your engineering process should not be changed to adapt to the tool. The application must allow you to define your process and change it in the future.
  5. Consider data management. Your CM system should support industry standards for data access like SQL as well as third-party report generators and other decision support tools. CM systems should support definitions of software, hardware and documentation objects with the ability to associate user-definable attributes.
  6. Pay attention to impact analysis support. The ability to have the linkages between commonly used software and hardware components to the products that use them is essential. You want to be able to scope how large changes are going to be. You also want to test and validate the quality of all the products that will use any changed part.
  7. Request support of geographically distributed development. Organizations today are no longer centralized in their development, but are geographically distributed. This means that you still want to take advantage of common code and common knowledge from different locations.
  8. Investigate the set-up/maintainability. Check how difficult the system is to set up and maintain. Understand that more powerful systems will require more set-up. Ask whether the vendor can help you through the initial set-up.
  9. Check the product support and the stability of the system. Inquire whether the vendor can provide worldwide support. The stability of the system is critical.
  10. Inquire about the completeness of the change life cycle. Ask how well does the system support defect tracking and enhancement requests or integrate with other systems. This includes customer support and the helpdesk, because they are usually on the front end of the change cycle.
- Tani Haque, CEO of SQL Software (Vienna, Va.)

## PRACTICING SAFE SOFTWARE

BECAUSE SOFTWARE product managers have an obligation to the client, they should insist on good testing tools. Unfortunately, too many programmers feel extensive testing gets in the way of moving onto the next "fun" project. But the availability of professional-level testing tools sends a message to testing personnel: your job is important.

Unfortunately, many testing organizations are staffed by people with less software experience than the programmers whose work they evaluate. Automated testing tools bring a level of technological sophistication to the testing process which, if properly managed, may elevate the testing personnel to a skill level that corresponds to that of the developers.

It's also easier to hire top-quality personnel to do testing, when job candidates see that you have placed testing *and* development on the same level. In fact, testing should always be included in the project design as an integral phase of the entire software product life cycle, including maintenance — the longest phase. If the test plan doesn't include maintenance, it's incomplete.

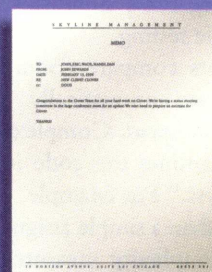
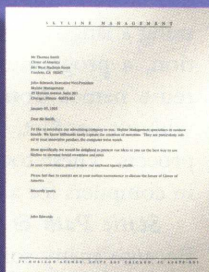
As a schedule of events to be accomplished over time, a Software Test Plan (STP) must declare who does what and when. An STP must include activities for static and dynamic testing. Both are required for software reliability.

## NO STATIC AT ALL

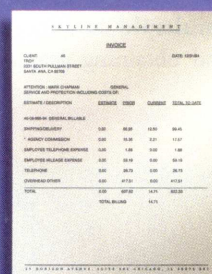
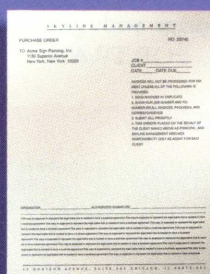
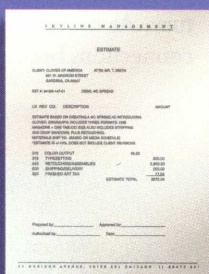
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readable properties of the software. Static testing also includes "inspection." Formerly called "desk checking," inspection is reported to catch between 60 percent and 80 percent of early software defects.

Automated testing tools support at least six kinds of static testing.

**Auditors.** Auditors compare coding standards to actual code automatically.

**Complexity Measurement.** Complexity measurement examines the code in terms of its "busy-ness." For example, a nested **if** is "busier" than a simple assignment statement. Complexity measurement can be used for: predicting maintenance and testing difficulty; identifying code that needs to be revised; estimating probable number of defects; analyzing multiple language implementations; and obtaining graph-

## Static testing includes "inspection" which is reported to catch between 60 percent and 80 percent of early software defects.

ical reports of program complexity.

**Cross-referencing.** They are essential for a language with global data such as COBOL, FORTRAN or BASIC. A

good system-wide cross-referencing tool helps maintain the consistency of a design, and makes it easier to define test plans and test scripts. Automated tools encourage the use of a normalized data dictionary across the entire design. When using a language that permits encapsulation, a programmer may conveniently reuse names from the data dictionary, without conflict, to enhance the testing process. These tools have been included in compilers for a long time.

### **Static Path & Data-flow Analyzers.**

Because many software systems include data-flow and control-flow, testing every possible path in a large program is a huge undertaking, given the need to deploy most software sometime in this century. As modules become larger and the connections between them become more

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## 270 MB UNIT IS AVAILABLE FOR HP9153 REPLACEMENT

ISA announced the addition of a new 270 MB unit to its family of HP9153 replacement FloppyDisk with HardDrive sub-systems. For more than 10 years, ISA has been supplying 46 MB and 118 MB units. Now, this unit gives users even more flexibility. Price is \$2,220. Contact their Floppy Disk Family Dept. at (713) 493-9925.

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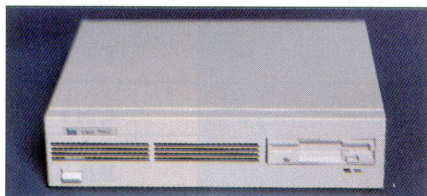
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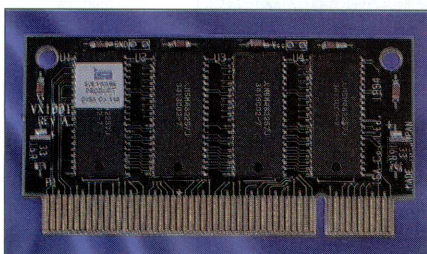
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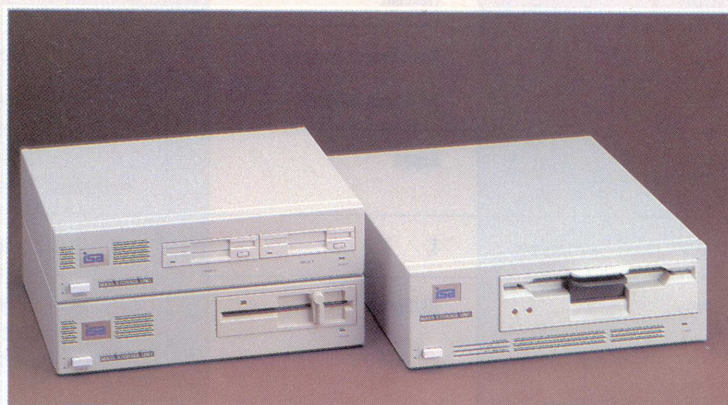
## MULTIFUNCTION 4MM TAPE SUB-SYSTEM

Texas ISA, Inc. introduced a new 32 GB Multifunction 4mm Tape Sub-System at Interex '94 in Denver, Colorado. Two models are available: 5032S-Dual for DDS-I and 5034S-Dual for DDS-II. The units feature: off-line tape-to-tape copy, verify, mirroring, cascading, and alternating drives. Supports HP, Sun, IBM and DEC. Texas ISA can be reached at (713) 493-9925.

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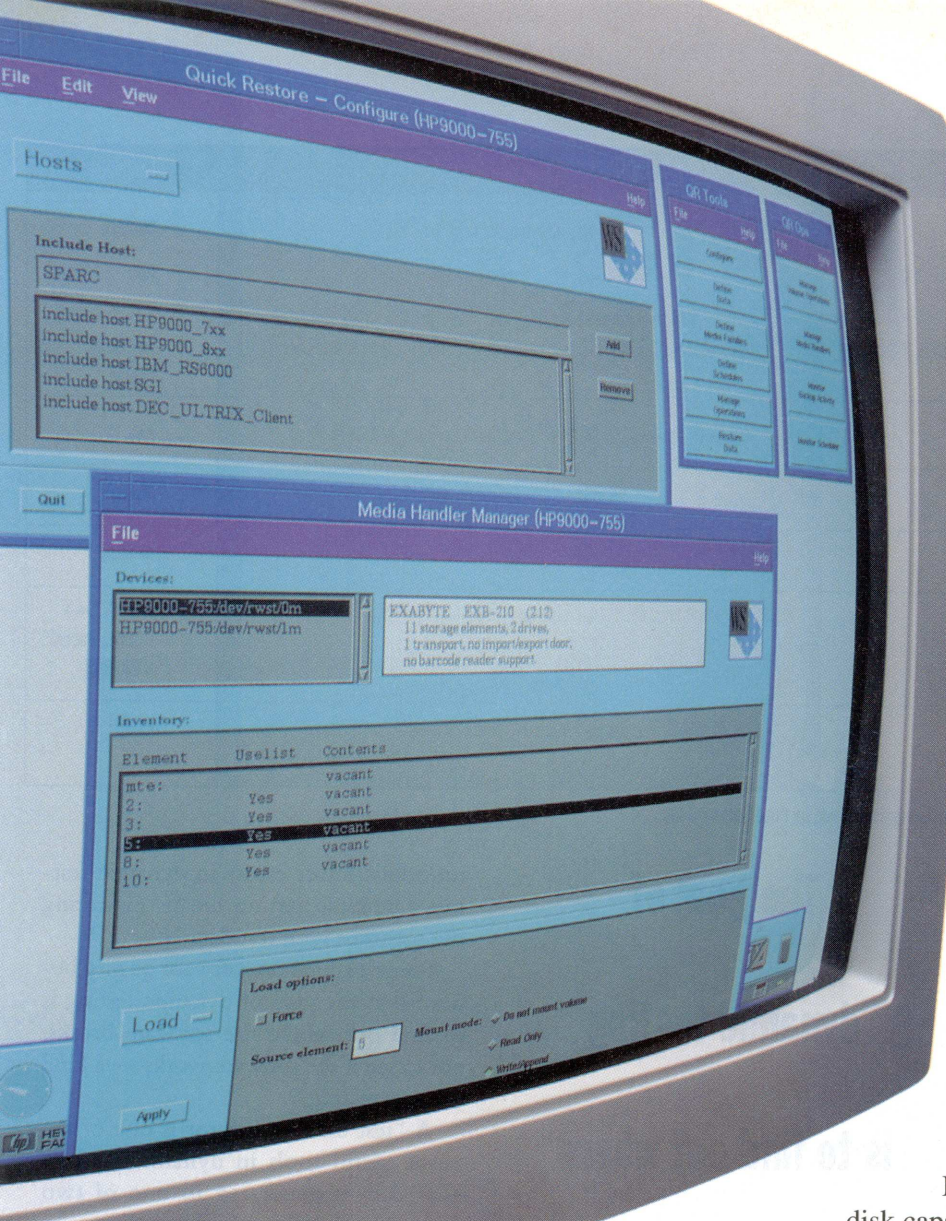


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Company	Product	Function	Language
Accel8 Technology Corp.	DCL8	Emulator, Rule-based Shell, Syntax & Semantics Checker	Multiple
	INTEGR8	Data Extractor, Linker	Multiple
AIB Software Corp.	Sentinel	Static and Dynamic Program Analyzer, Memory Leak Detection	C, C++
Asta	QA C, QA C++	Static and Dynamic Analyzer	C, C++
Biomation	CLAS 2000 & CLAS 4000	Performance/Timing Analysis/Data Capture	Multiple
Blossom Software	Safe C	Coverage/Frequency Analyzer, Performance/Timing Analyzer, Tracer	C
Cadre Technologies	Teamwork/TestCase	Requirements Test Generator	C, C++
Corporate Computer Systems	Delta	Comparator	Multiple
Gimpel Software	Flexelint	Static program analyzer	C, C++
Hewlett-Packard	Basis Branch Analyzer	Coverage/Frequency Analyzer	C
	HP Branch Validator	Coverage/Frequency Analyzer	C, C++
Intellicorp	Kappa	Simulator, Expert System Tools, Performance/Timing Analyzer, Reuse Identifier, Translator	C++, Pascal, FORTRAN
Interactive Development Environments	T	Quality Measurer, Requirements-Based Test Case Generator	Multiple
McCabe & Assoc.	Battlemap	Complexity Measure, Static Path Analyzer, Structure Checker, Test Data Generator	C, Ada, Assembler, COBOL, Pascal
	McCabe Instrumentation Tool	Coverage/Frequency Analyzer, Static/Flow Path Analyzer, Test Data Generator	Ada, C, COBOL, FORTRAN
Mercury Interactive Corp.	Xrunner	Capture-Replay Tool	Multiple
Microtec Research Inc.	XRAY	Debugger, Simulator	C, C++
Minitab Inc.	MiniTab	Data Reducer, Statistical Analyzer	Multiple
Parasoft Corp.	Insure & Insure++	Static & Dynamic Program Analyzer, Memory Leak Detection	C, C++
Performance Awareness Corp.	preVue-, preVueX, Xspert	Program Testing	N/A
Performance Software, Inc.	V-Test	Functional, Regression and Performance Testing; Capture/Replay, 4GL Scripting Language	Multiple
Program Analysers Inc.	Testbed	Assertion Analyzer, Complexity Measurer, Coverage/Frequency Analyzer, Cross Referencer, Static Path Flow Analyzer, Static Data Flow Analyzer, Status Displayer, Structure Checker, Syntax & Semantics Checker	Ada, Assembler, C, COBOL, FORTRAN
Pure Software Inc.	Purify Static and Dynamic Analyzer Memory	Leak Detection	C, C++
Qualtrak Corp. *	QTEST	Automated Test Management System	Multiple
Rational Software	VADSWorks	Disassemblers, Emulators, Optimizer	Ada, C, C++





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Company	Product	Function	Language
Software Research Inc.	CAPBAK	Capture-Replay Tool	Multiple
	EXDIFF	Comparator, Reuse Identifier	Ada, C, COBOL
	TCAT	Coverage/Frequency Analyzer, Structure Checker,	Ada, C, COBOL,
	(S-TCAT, TDGEN, T-SCOPE)	Performance Timing Analyzer, Test Data Generator, Reuse Identifier	FORTRAN, Pascal
Software Systems Design Inc.	TestGen	Coverage/Frequency Analyzer, Test Data Generator, Test Planner	Ada, C
Technology Modeling Associates Inc.	TOPEX	Simulator, Statistical Analyzer	Multiple
Tiburon Systems	Ferrett	Capture-Replay Tool,	Multiple
Verilog Inc.	Logiscope	Auditor, Complexity Measure, Coverage/Frequency Analyzer, Quality Measurer	Ada, C, C++, COBOL, Pascal, FORTRAN
Westmount USA Inc.	ISEE	Reuse Identifier, Test Manager	COBOL

\* Editor's note: On March 14, 1995, Qualtrak Corp. and all its products were acquired by Pure Software Inc.

intricate, the programmer and tester confront the software equivalent of a Gordian knot. An automated test tool may help unravel the knot, or at least help to identify which strands are important.

**Structure Checkers.** These tools can help the tester determine which modules are called from other modules, detect dead code, and highlight unsafe programming practices (for example, recursion in safety-critical systems). Structure checkers are common in software re-engineering tools as well as ordinary coverage analysis tools.

Structure checkers are a potentially important part of any large-scale software project.

**Syntax and Semantics Analyzers.** Syntax and semantic analyzers (included in most modern programming languages), whether part of a compiler or a third-party tool, should help you: detect if there are uninitialized variables in the program; detect if formal and actual calling arguments match; check for semantic errors; flag variables that are defined, but not used; identify potential memory leaks; and identify "wild" pointers.

For programs in C and C++, a static analyzer becomes de rigueur on any important software project.

Static program testing is supported by a large number of tool vendors. Those

## The goal of dynamic testing is to find out where the software breaks, not to see if it works.

that support HP-UX environments are listed in *Table 1*.

### ACHY, BREAKY SOFTWARE

IF YOU ARE effective in detecting errors with static tools, you will probably

introduce fewer errors in dynamic testing. Dynamic testing means executing the software with test data.

Some experts on software quality believe that the goal of dynamic testing is to find out where the software breaks, not to see if the software works — a kind of stress testing.

A "test case" generator is one of the more useful tools in dynamic testing. Test data is generated in one of two ways: functionally and structurally.

Functional test code generation originates in the software requirements and tends to be language-independent. Structural test generation is derived from the program's structure, and may be more language-specific. Structural Strategies include branch coverage (HP's Basis Branch Analyzer) and path coverage. Branch coverage follows the conditional statements of a program, where each control code segment is executed at least once.

Path coverage is more detailed because it requires complete execution of every conditional statement and all of its associated code, including subsidiary conditional statements.

But, path coverage is often much too expensive because of the permutations of possible executable paths in a large program.



The automatic generation of test data can be random, algorithmic or heuristic. Good test generation programs will use all three.

Heuristic test generation, which is sometimes called "failure-directed," uses input from the people who are testing the software. The input is derived from historical data regarding failures, and should be continually updated.

Random test generation, on the other hand, chooses input structures and data values to form a statistically random distribution, which corresponds to an industrial quality assurance model.

Lastly, the algorithmic method for test generation follows a specific set of rules, which are similar to an "expert system" approach. Algorithms might include equivalence class partitioning, boundary class analysis, functional analysis and cause-effect graphing.

## GOING TO THE HEAD OF THE CLASS

IT PROFESSIONALS will exercise less than 40 percent of the application code when constructing tests without using formal methods. That's why a draft test plan should be put in place at the beginning of a software development project. When developers and maintenance programmers know there is a uniform standard within your organization for the testing process, they will tend to produce quality programs earlier.

Besides the discipline imposed by testing tools an investment in automated test tools will have significant payoff over the total life cycle of your software product.

Remember, it costs much more to repair defects discovered by a user after deployment. After all, quality is built-in, not tested out. —Richard Riehle is a software engineer at Adaworks (Palo Alto, Calif.), and HP Professional's Software Engineering Columnist. He can be reached at [riehle@cardinal.com](mailto:riehle@cardinal.com)

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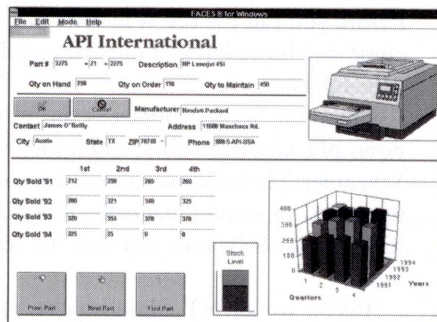
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# Getting AT It In Windows NT

In my March UNIX column, I wrote about the **at** command. But

just as in HP-UX, Microsoft Windows NT also includes an **at** command that allows you to schedule applications or batch files at a given time. (Note: While commands in Windows NT are not case-sensitive, we have chosen to write them lowercase to be consistent with HP-UX) Before you can use the Windows NT **at** command however, you need to start the Scheduler.

Open the Services applet in the Windows NT Control Panel, and locate the Scheduler. The Scheduler is probably configured to be started manually, therefore highlight the Scheduler and click the Start button.

If you are an NT administrator, you can specify that the Scheduler start automatically upon boot up. Highlight the Scheduler, click the Startup button and choose Automatic. If you don't want to enable the Scheduler, click the Disable button.

In the Startup menu, you can specify that scheduled tasks are to run as the system; or you can provide a username and password. You can even specify a username on a different system, in which case the task will be executed on the other system by default.

Note: In Windows NT 3.5, there is a

problem running scheduled tasks that interact with the display. You might think that checking the "Allow Interaction" box in the Startup menu would allow automatic tasks to interact with the user — but this is not the case. Until a future release fixes this problem, you need to specify the **/interactive** option on the command line when you run the **at** command. More about this later.

## YOUR ATTENTION ONCE AGAIN

Once you have the Scheduler running, you can use the **at** command in any batch command file or at the Windows NT command prompt. Its simplest form allows you to run a command:

```
at 15:00:30 /interactive "notepad.exe"
```

As long as you are logged on, you will see the Notepad utility pop open shortly after 3 p.m.

If you've scheduled a task to run at a particular time interactively, the system will execute the task no matter who is logged in when the job runs. Thus, a user to whom you have granted a few privileges could take advantage of additional account privileges if that user happens to be on your system when the scheduled job executes. Therefore, use this capability carefully.

As I hinted earlier, you also can run applications on other Windows NT systems using **at**. This lets you schedule compute-bound processes on your best number cruncher, or schedule network-wide backups on a system that includes a tape drive. To take advantage of other network resources, simply add the system



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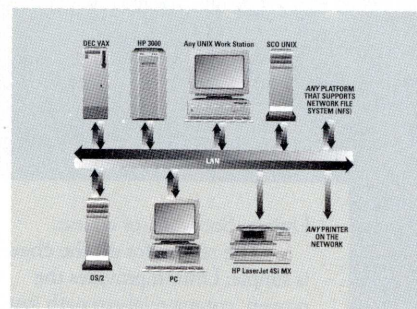
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name in the **at** command:

```
at \\Calvin 15:00:30 c:\bat\daily.cmd
```

This will perform the batch file `daily.cmd` on the network system Calvin shortly after 3 p.m. Notice the subtle differences between this invocation and the earlier one. This task will be scheduled to run on the system known to Windows NT as Calvin, but it will not allow user interaction on Calvin or your workstation because the **/interactive** option is not specified.

Also, take note of the extension `CMD` on the batch file. MS-DOS and Windows users might expect a file extension of `BAT`, but the Scheduler will not run MS-DOS batch files. In Windows NT, the native 32-bit com-

**You can run applications  
on other Windows NT systems  
using `at`. This lets you schedule  
compute-bound processes on your  
best number cruncher, or  
schedule networkwide backups  
on a system that includes  
a tape drive.**

mand interpreter is called `CMD.EXE` rather than the 16-bit `COMMAND.COM`. Hence, under Windows NT, `.BAT` files run in a 16-bit environment and `CMD` files run in full 32-bit native NT.

If you start the MS-DOS Commands icon from the Windows NT Program Manager, you get `CMD.EXE`. You'll find that file and directory names can be upper and lower case. Type **command**, and you'll see all of the file names become upper case, indicating that you are running 16-bit `COMMAND.COM`, even though the **ver** command reports Windows NT 3.5.

All of the examples thus far schedule tasks at the next specified time. For example, say you schedule a task for 3 p.m. If you do that after 3 p.m., Windows NT will schedule the task to run the next day. If you want to specify a date more than 24 hours in the future, you can use the **/next** parameter. To schedule a task to occur more than once in the next week, you can specify more than one day on the command line:

```
at 16:00 /next Sunday C:\JOBS\CALLME.CMD  
at 01:00 /next:Monday,Wednesday,Friday C:\JOBS\BACKUP.CMD
```

And to schedule a job to run multiple times, you can use the **/every** parameter:

```
at 18:00 /every:Sunday "C:\JOBS\WEEKLY.CMD FULL"
```

This example also shows that you can put double quotes around the entire command line specification if you have parameters you want to pass to the scheduled application or batch file.

#### STATUS UPDATES

Finally, to check the status of pending tasks, use the **at** command with no parameters. To cancel pending jobs, simply provide the task ID reported when you first scheduled the task, and also is reported when you check the status of all pending jobs. To delete task ID 25, use the command:

```
at 25 /delete
```

To cancel all pending jobs, enter the same command but specify no task ID. You will be prompted to confirm cancellation of each task. To cancel all pending tasks without verification, enter:

```
at /delete /yes
```

Now you can schedule those weekly jobs you want to perform on your NT workstation or server. Combined with system capabilities like Remote Access Server and Backup, and with command files you create, the **at** command lets you make your NT system more useful.

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CIRCLE 481 ON READER CARD



# HP-UX SCSI Drive Options

## There are two ways to add SCSI drives to HP-UX workstation

systems: by using the System Administration Manager (SAM), or by using low-level HP-UX utilities. The former presents a simple-to-use, graphical interface that any superuser can use; the latter requires poking around the ugly hardware-dependent side of HP-UX and UNIX. While the latter method may take some time, mastering the basic steps will enhance your knowledge of system administration.

In fact, understanding the low-level

process may be the only way to add some of the less expensive SCSI drives to your HP-UX system, even when the vendors are well-known disk manufacturers.

### PLAY IT, SAM

The steps to use SAM to add a new SCSI disk drive to your existing HP-UX system are very simple and are listed in *Figure 1*.

Note: Because SCSI drives can identify themselves, as can many SCSI controllers, I like to use **diskinfo** to examine the drive before I have SAM look at it. If SAM reports a problem and cannot add the new drive, you should view the SAM log file to identify and correct the problem. In my experience, the most likely problem you'll encounter is that the new drive doesn't identify itself in a way that SAM can use to locate the drive parameters in the `/etc/disktab` file.

Please note that this problem can still

### FIGURE 1

#### Adding Disk Drives Using SAM

1. Determine if you have an unused SCSI address on your system.
2. Determine if the new drive is internally or externally terminated.
3. With the system turned off, physically connect the new drive to the existing chain of SCSI devices.
4. Boot the system and log in as root.
5. Open an hpterm window and use the diskinfo utility to confirm that HP-UX can locate and identify the drive.
6. Start sam.
7. Choose "CD-ROM, Floppy and Hard Disks." Then choose "Local File Systems."
8. Select "Add..." from the "Actions" menu.
9. Identify the root level directory into which the new file system will be mounted.
10. Press "OK."



## Understanding the low-level process may be the only way to add some of the less expensive SCSI drives to your HP-UX system.

occur even if **diskinfo** can identify the drive. Either way, if SAM cannot add the drive, you'll have to tinker with the HP-UX utilities, which I'll describe later.

Once SAM has added the drive, you should find it immediately available for use. But just to be safe, you might want to examine the file permissions on the newly mounted directory that represents the new drive, as well as look at the output from **df** to confirm the disk configuration.

With SAM, that's it. It doesn't get much easier than that.

### DON'T PLAY IT AGAIN, SAM

If you don't want SAM to play it for you, or if you're a DIY kind of person, you can use HP-UX commands to imitate what SAM does. The steps for are similar to those listed above, and are shown in Figure 2. This is almost as easy as using SAM and it gives you more control.

You may want to do it yourself because your drive and controller don't identify themselves in a way that HP-UX expects. Because HP-UX device drivers do not self-configure, the operating system maintains low-level information in `/etc/disktab` for every type of disk you may want to use. Because HP-UX only provides entries for supported drives, you may find that you need to do some tinkering before HP-UX can see the drive.

Browse the `/etc/disktab` file to see if you can find the name of the disk drive you are trying to add. I've seen cases where **diskinfo** could properly identify the drive, but neither SAM nor **newfs** could. **newfs** uses entries found in the in the `/etc/disktab` file to obtain a definition for the file system.

If the drive is not in `/etc/disktab` at all, and you cannot obtain a suitable entry from the vendor where you purchased the drive, you may need to create your own entry in `/etc/disktab`. This requires a

bit more tinkering, but don't let the low-level nature of the task scare you away. Very often, you can find the information HP-UX wants in the disk drive owners manual or from the manufacturers online system. Then, as you define the number of tracks and sectors and such, you'll have a better appreciation for the tasks that SAM does for you.

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[kehoe@cardinal.com](mailto:kehoe@cardinal.com)

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### FIGURE 2

#### Adding Disk Drives Using HP-UX Commands

1. Determine if you have an unused SCSI address on your system.
2. Determine if the new drive is internally or externally terminated.
3. With the system turned off, physically connect the new drive to the existing chain of SCSI devices.
4. Boot the system and log in as root.
5. Open an `hpterm` window and use the **diskinfo** utility to confirm that HP-UX can locate and identify the drive.
6. Initialize the drive, if necessary, using **diskinit**.
7. Create a new file system using the **newfs** or the more traditional **mkfs**.
8. Add the file system to the list of systems to be mounted whenever you boot up your system by editing `/etc/checklist`.
9. Mount the file system manually using the **mount** command.

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# Tempest Fusion

In 1992, a group from HP spearheaded by Derek Coleman, combined two

popular object-oriented (OO) methodologies — Booch and Object Modeling Technology (OMT), along with several other popular OO methodologies to produce something called Fusion.

James Rumbaugh, one of the principal authors of OMT, left General Electric to join Grady Booch at Rational Software Corp. (Santa Clara, Calif.) in October

1994, to combine the best of their popular methods. The fact that Rational is putting Booch and Rumbaugh in a rubber room to bounce around their viewpoints affirms the usefulness of deriving the best from the two methods.

Meanwhile, HP's Fusion is here, and Paradigm Plus, the first CASE tool to support it, is available from Protosoft (Houston, Texas). Bertrand Meyer, designer of the Eiffel programming language calls Fusion "... the fusion of some of the best of object-oriented methodology."

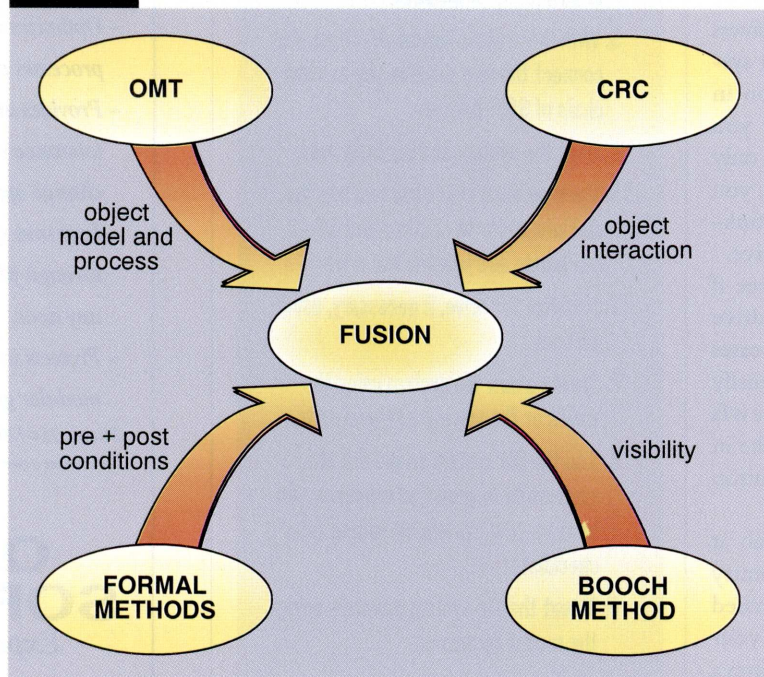
Figure 1 shows the major influences on Fusion.

## CLASS ACTION

Because the designers identified "process" as one of the weaknesses in many OO methods, they incorporated a process model into the Fusion methodology. OMT has a rich notation for analysis, and Fusion adopts this notation with some modification.

Class-Responsibility-Collaborator (CRC), another influence on Fusion, is often called the CRC Card method. This is because CRC originally employed simple index cards to represent classes. These are sometimes called "class cards." The use of CRC cards is quite useful for creating concise abstractions of classes, shuffling them into inheritance relationships and experimenting with possible interactions between the objects of those classes. CRC is an impor-

FIGURE 1





## Booch modeling representations include class, object, state transition, timing, module and process diagrams.

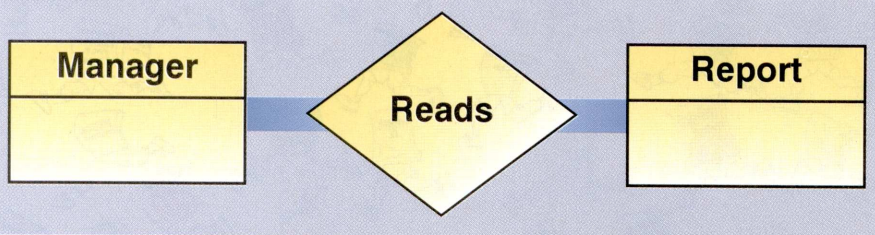
tant influence during the Fusion design phase.

The Booch method is exceptionally rich in notation for the design of complex systems. Booch includes class, object, state transition, timing, module and process diagrams. To some designers, the vast number of modeling representations is both a strength and weakness of the Booch method. If you are building a truly

the first OO methods to successfully integrate this long-ignored idea into its model.

Good old-fashioned "structured analysis" is not included in the Fusion diagram. But this fading method makes a contribution to Fusion's data dictionary feature. Although OMT and Booch briefly mention the need for a Data Dictionary, almost no other OO author gives sufficient attention to this topic. Fusion includes a detailed description of how to

FIGURE 2



complex system, it is easy to appreciate the semantic subtleties of Booch. In addition, Booch is well-supported by Rational's Rose/C++ and Rose/Ada.

However, Fusion doesn't buy wholesale into the Booch notation. While recognizing the importance of Booch semantics and method, Fusion designers chose to use a mathematics-like, symbolic notation in place of some of Booch's diagrammatic symbols. Because of its special notations in timing, object and state diagrams, Booch may continue to be better suited to modeling concurrency in system architectures. For Fusion, the main contribution of the Booch method is found in visibility graphs during the design phase.

Formal methods are usually based on a formal logic approach to software system specification. One of the best known formal methods is "Z" (pronounced zed), with Z++, a newer version to support the emergence of object technology. The contribution of formal methods shows up throughout Fusion, and this may be one of

design an effective data dictionary. This formalization of the data dictionary provides substantial continuity for CASE tool support and holds the promise of enhancing the maintenance phase of the software lifecycle.

The Fusion process has three stages: analysis, design and implementation. Initially, it might seem odd that there is no requirements stage. Also, a requirements specification is frequently the most difficult task for the software engineer. The Booch method addresses requirements definition more directly.

### ANALYSIS, DESIGN AND IMPLEMENTATION

Fusion's analysis stage does include much of what we might consider requirements definition. It focuses attention on the "what" with corresponding relationships between each "what." This is where the analysis notation borrowed from OMT is especially strong. However, unlike OMT class symbols, there is no "operation" part within a class symbol. In Fusion, relations, in the form of predicates, are shown

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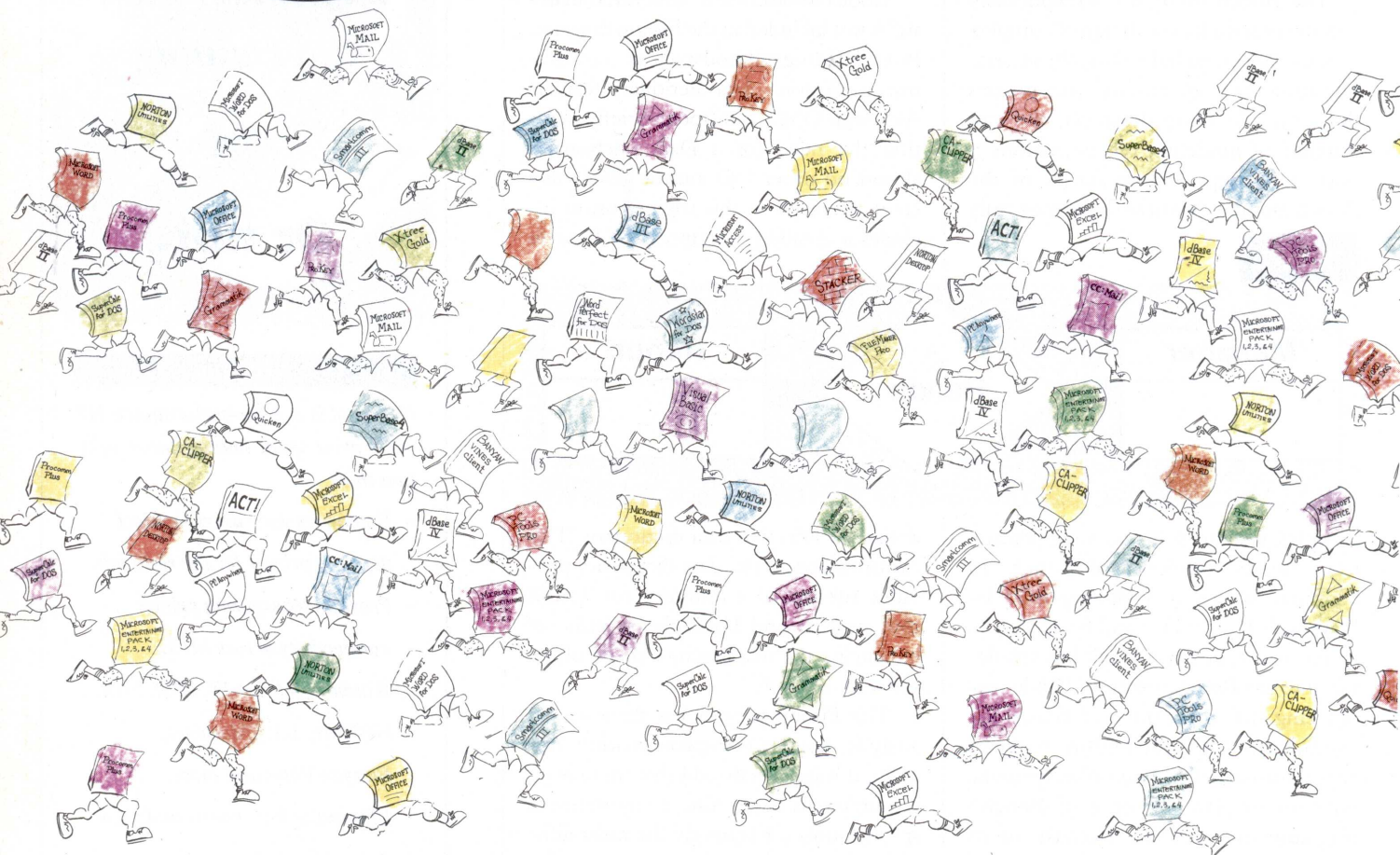
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## Although Fusion is language independent, its design features correspond nicely to Eiffel and C++, as well as Smalltalk.

as diamond symbols relative to each class diagram (see Figure 2).

In this stage, the emphasis is on identifying the classes, showing relationships between the classes, system-level operations and legal sequences for operations between classes. There is a feature for the operational model that supports precondition/postcondition specifications reminiscent of the class "contract model" of the Eiffel language.

One of the important considerations in the design process is the construction of Object Interaction Graphs. Note that Fusion considers communication between objects as "message passing." This reflects an influence from Smalltalk. In Smalltalk, sometimes called the quintessential object-oriented programming language, every entity is an object which may be created dynamically, and objects are related to each other via a loosely-coupled message/method mechanism.

In addition to Object Interaction graphs, Fusion design specifies Class descriptions, Visibility graphs and Inheritance graphs. Visibility Graphs are based on the client-server notion. In keeping with the notion of dynamic communication between objects, Fusion models the visibility for dynamic and permanent relationships. Other visibility issues include duration, bandwidth (sharing) and mutability. For example, mutability might indicate whether the kind of visibility to a server constant will fluctuate over time.

Class descriptions are textual models which correspond closely to the class units in many OOP languages such as Eiffel and C++. They are relatively straightforward in structure, but one must pay close attention to the notation provided for inheritance, attribute visibility and method parameters. These are important for resolving class descriptions into source code during the implementation stage.

Inheritance graphs permit relationships such as abstract superclasses, as well as single and multiple inheritance.

The implementation stage is a natural,

seamless step from the design stage. This is important because not all OO methods are so easily converted into actual source code. There are three phases for implementation: coding, performance and review. Although Fusion is language independent, its design features correspond nicely to Eiffel and C++. They also will resolve well into Smalltalk if the design does not depend heavily on multiple inheritance. Ada 95 also can be used with Fusion, but the implementor may take a slightly different view of Class. This should be no problem because the authors of Fusion indicate that the CLOS language, which is fairly close to Ada's package model, is appropriate for implementation.

OO development methods are often criticized for their narrowness in notation, diagramming or support of the software lifecycle. Some methods are too heavily weighted on the analysis phase, others on the design phase, while others emphasize the programming process. However, with Fusion gaining more and more adherents, the move to consolidate OO methods is gathering momentum.

### FOR MORE INFORMATION

According to Jack Rothrock, developer of Paradigm Plus at Protosoft, "Fusion is becoming popular with numerous Fortune 500 organizations, and developers once loyal to other methods are now taking a closer look at Fusion." Also, other CASE tool developers are working on support for Fusion. In addition to CASE tools, you can get Fusion training and information from HP at (800) 472-5277. To learn more on your own, read *Object-Oriented Development, The Fusion Method* (Prentice-Hall, ISBN 0-13-338823-9).

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# DCE Comes To The HP 3000

f HP, IBM, DEC and the 400 plus other members of the Open

Software Foundation (OSF) have their way, the Distributed Computing Environment (DCE) will be "enabling technology" that actually makes distributed client-server computing possible. DCE takes you the step beyond traditional client-server to where the entire application, including procedures and data, is broken up over multiple systems.

HP, along with other major computer vendors, created the OSF in 1988 to "assist the information technology industry in research, development and delivery of key vendor-neutral technology (software source code) to make open systems possible." DCE, a key result of this collaborative effort, "forms the foundation for the development and use of distributed applications in multiplatform, open systems computing environments. It makes unconstrained information and application access a reality."

Actually, distributed computing is not new. For many years, users of the HP 3000 have been able to use NS/3000 to split applications across multiple HP 3000s. Other vendors have had similar solutions. In today's heterogeneous computing environment, a mechanism is needed to distribute applications across multiple platforms. DCE is that mechanism. With

DCE, a single log-on enables a user to reach data on any DCE server without knowing its location or how to navigate to it.

The main components of DCE are: Cell and Global Directory Services (CDS and GDS); Remote Procedure Call (RPC); Security Service; Threads; Distributed Time Service (DTS); and Distributed File Service (DFS).

RPC, CDS, Security, Threads and DTS comprise the "secure core" and are the required components of any DCE installation. DFS is an optional component. DCE also includes administration tools to manage these various components. DCE/3000 includes all the above DCE functionality.

A cell is the basic unit of operation and administration in DCE. It is a group of users, systems and resources, possibly geographically dispersed, that need to work together as a whole. In the distributed model, the client sees the cell as one integrated system. A DCE environment can consist of multiple cells.

Each resource in a cell, such as a file or device, has a unique name. The CDS stores the names of all resources in the cell. When presented with a name, the CDS returns the unique address of the named resource. The GDS controls naming between cells. GDS is an implementation of the international X.500 Directory Services standard.

The DCE RPC facility, a key component of DCE, provides a way for software modules running on different systems to communicate. With RPC, a program on one computer can call a proce-

## EDITOR'S NOTE

*This month we rename the "Managing Your HP 3000" column to "Integrating Your HP 3000," thereby capturing the new focus of our magazine — Integration. With the April column, John P. Burke introduces DCE on the HP 3000. Future columns will address how the HP 3000 fits into the world of Open Computing.*



ture on another computer. NS/3000 allowed this between HP 3000s. DCE enables this across different architectures. To see how difficult this would be if the programmer had to deal with it, consider that most computers use the ASCII code to represent character data while IBM mainframes use EBCDIC. Also, processors can use different binary formats (little endian vs. big endian). With DCE's RPC mechanism, these conversions are handled automatically.

The DCE Security Service provides a reliable way for determining if a user should be allowed to perform a certain action. The DCE Security Service provides authentication and authorization services.

DCE Threads is an implementation of the POSIX 1003.4a standard. Threads add parallelism to applications. Similar to multiple child processes, the threads of a

## DFS provides a seamless view of all files in a cell, regardless of physical location.



father process use the same address space, sharing open files, data and anything else that is available to the father process.

The DTS synchronizes time on all DCE hosts so applications dependent on

time for event sequencing, event scheduling and duration timing function correctly, independently of where they occur. DTS also is used to limit the lifespan of security information.

The DFS provides a single, seamless view of all files in a cell, regardless of physical location. Security is provided by the DCE Security Service.

At the January HP 3000 Technology Closeup on IMAGE/SQL and Client-server Tools, a handout included a short section on DCE. It stated that applications using DCE could not be developed on the HP 3000. This is not true. C is required, but everything else necessary to develop applications using DCE is included in DCE/3000.

What is not included, *nor currently planned*, are tools such as OODCE/9000, an object-oriented development tool based on C++ for writing applications using DCE on the HP 9000. This month, HP is set to start shipping DCE for the HP 3000. (DCE has been available for the HP 9000 since 1992). DCE/3000 will be sold, much like Workload Manager, as a separate, complete product. But the client portion will not be bundled in.

The OSF maintains a World Wide Web (WWW) server with information about the OSF and all OSF products, including DCE. The URL for the OSF's home page is: <http://www.osf.org:8001>

There also is a USENET Newsgroup specifically devoted to DCE at: [comp.soft-sys.dce](mailto:comp.soft-sys.dce)

A Frequently Asked Questions (FAQ) document about DCE is available on the OSF WWW server and the [comp.soft-sys.dce](mailto:comp.soft-sys.dce) newsgroup.

Several people at HP recommend the book *Understanding DCE* by Ward Rosenberry, David Kenny & Gerry Fisher (O'Reilly & Associates Inc., ISBN 1-56592-005-8). The first 100 pages are a general overview, with some good diagrams. The remainder of the book serves as a tutorial, with sample C code, for those wanting more detail about working with DCE.

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[burke@cardinal.com](mailto:burke@cardinal.com)

### BURKE'S BITS

● **Spool File Print Order Update.** Good news. I have a program, ALTSPF, that has been in production for several months in our shop taking the place of SPOOLF. It sets priority, device and number of copies, while re-ordering the spoolfile print queue to reflect the order the spoolfiles are "altered." The bad news is that, for expediency sake — because I still haven't taken the time to learn C or PASCAL — I wrote it in SPL, using the switch subsystem to call the NM AIFs.

Do not try this on your production system. The operating system AIFs frequently require data structures with multiple 64-bit virtual addresses embedded. CM knows nothing about 64-bit virtual addresses. Because you must be in Privilege Mode (PM) to call an AIF, passing an incorrect address can have unpredictable, and potentially catastrophic, results. During my testing, using an AIF that only READS system information, I managed to trash the root file of an IMAGE database that was in use by another user. The problem is caused by the fact you are in CM, trying to pass a NM address as part of a data structure. You must use the AIF AIFCONVADDR (setting up the switch stub for it) — and use it correctly — to avoid disaster.

● **Tricks Of The Trade.** With the **ANYPARM** option for UDCs and Command Files, and imaginative variable de-referencing, much is possible. The following UDC emulates the MS-DOS **TYPE** command.

```
ANYPARM PARM_LIST=![  
IF LEN('!PARM_LIST') = 0 THEN  
    ECHO Invalid syntax for TYPE command - s TYPE filename [ MORE]  
ELSEIF POS('|', '!PARM_LIST') = 0 THEN  
    PRINT !PARM_LIST;PAGE=0  
ELSEIF POS('MORE', '!PARM_LIST') = 0 THEN  
    PRINT !STR('!PARM_LIST', 1, (POS('|', '!PARM_LIST')-1)) + ';PAGE=23'  
ELSE  
    ECHO Invalid syntax for TYPE command - s TYPE filename [ MORE]  
ENDIF
```

The following, which highlights de-referencing, will change your command line prompt to **[nn]:**, where **nn** is the current command number (useful with the **REDO** and **DO** commands).

```
SETVAR HPPROMPT, "[!"+HPCMDNUM]:"
```

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# **new** Products

## **SOFTWARE**

### **Pacer Software Provides DAL Server For UNIX**

Pacer Software Inc. announced Version 1.5 of its DAL Server for UNIX, which allows Window users the high-level data access that Mac users have in the UNIX database systems. This software allows users to use desktop applications, such as Microsoft Excel, Lotus 1-2-3 and Blyth Software's Omnis 7.

Version 1.5 provides easy access to information residing in DB2 UNIX database environments. Users can now access data from a selection of relational databases, including DB2 and Informix.

The DAL Server supplies a fully integrated middleware solution that runs on Sun Solaris, HP-UX, DEC OSF/1 and IBM AIX.

Prices for DAL Server Version 1.5 begin at \$4,000.

Contact Pacer Software, 1900 West Park Dr., Ste. 280, Westborough, MA 01581; (508) 898-3300.

*Circle 400 on reader card*

### **AVM Informatique Offers GRAPHIC-FAX For HP**

AVM Informatique announced Mail Server and Topfax Server, which together manage the links with OpenMail and maintain the fax database, manage conversions of graphics and also perform general fax management tasks. The interface with the telephone system is achieved by using a low-cost, Hayes-compatible Class2 fax modem, which is connected to the serial port of the PC.

Sending faxes is achieved by joining together the documents in their original format to be sent as a fax, and entering the recipient details (name, fax telephone number) followed by /FAX.

Mail messages can contain any combination of files created by WinWord, Excel, Lotus 1-2-3, AmiPro or Freelance. The same message can contain files that were printed to the Topfax Printer Driver from any

Windows application. When Windows application files are sent in this way, the recipients can view the files in their original format. Fax status information is confirmed by mail to the sender.

Hardware requirements include: PC client OpenMail (486DX 33, 8 MB of RAM); MS-DOS, Windows, "client" application software and AVM software; and a Hayes-compatible Class2 fax modem. Options include: 001, Topfax for Windows to send faxes independently of OpenMail; and 002, SPOOL to send faxes in PCL5 from any HP 9000 application.

Pricing ranges from \$4,900 to \$9,900, depending on the number of licenses and options.

Contact AVM Informatique, 52, Route de Saint Genis Laval, 69540 Irigny, France: 33 78 56 59 13.

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### **Lucas Management Systems Releases Version 4.2**

Lucas Management Systems announced Artemis Schedule Publisher version 4.2, which offers resource leveling, critical path analysis and earned value management. This software also offers upgrades to the advanced product scheduling and reporting product on the PC and Mac platforms.

The application operates on Sun, HP, IBM RS/6000, AT&T and Data General. Version 4.2 also can merge, link or exchange data across UNIX, Windows and Macintosh.

Version 4.2 has a sub-project option that enables the breakdown of a project into smaller portions. A resource processing capability allows project managers to determine the length of a task based on the required effort and resources available.

Pricing begins at \$1,995 for Windows or Mac, and \$2,995 for UNIX workstations. Contact Lucas Management Systems, 3702 Pender Dr., Ste. 300, Fairfax, VA 22030; (703) 277-1050.

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### **Eventus Introduces WATCHWORKS 3.0**

Eventus Software Inc. announced WATCHWORKS 3.0, an event-monitoring and expert-advice tool for Oracle RDBMSs. This software eliminates downtime by forewarning administrators of potential database and system troubles.

WATCHWORKS 3.0 is capable of monitoring Oracle version 6 and 7 running on any platform, including UNIX, VAX/VMS, NetWare and MVS.

Pricing for WATCHWORKS 3.0 begins at \$1,200.

Contact Eventus Software, 1250 Bayhill Dr., Ste. 113, San Bruno, CA 94066; (415) 871-0700.

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### **The Support Group Adds Upgrades For MANMAN**

The Support Group Inc. announced a full line of HP's MPE/iX hardware and upgrades tailored to the specific needs of MANMAN software users. The manufacturing application makes unique demands on hardware configurations.

The Support Group fine-tunes HP 3000 specifications for performance beyond stock configurations.

Contact The Support Group Inc., 7707 Jester Blvd., Ste. 300, Austin, TX 78750; (800) 787-7078.

*Circle 397 on reader card*

### **SBA Produces NTG For UNIX**

Software Business Applications announced Network Terminal Gateway (NTG), which is software that expands the open systems options for companies seeking to maintain inbound login capabilities to the Wang VS. This software is for HP-UX, IBM AIX, Sun Solaris and PC-based UNIX operating environments.

NTG allows virtually any terminal or PC attached to any CPU or server running TCP/



IP to become a terminal to the Wang VS and access VS applications. This includes PCs, LANs, UNIX systems, Macs, minicomputers or combinations of these platforms.

Contact Sentinel Technologies, 2550 Warrenville Rd., Downers Grove, IL 60515; (708) 769-4300.

*Circle 396 on reader card*

### **Denmac Extends NMS With TrenData 2.0**

Denmac Systems Inc. announced TrenData 2.0, an extension to Novell's NetWare Management System (NMS). This software captures, stores, interprets and reports long-term network statistical data acquired by LANalyzer agents and other RMON-compliant devices. It also interacts with devices from Network General, HP, Cabletron and Synoptics.

Version 2.0 features an enhanced baseline engine that can simultaneously collect statistics from the History and Host RMON Group. Contact Denmac Systems, 1945 Techny Rd., Northbrook, IL 60062; (708) 291-7760

*Circle 395 on reader card*

### **QStar Expands MastarMind With Backup and Restore**

QStar Technologies announced MastarMind Backup & Restore, which features automated system administration, intelligent scheduling, and volume and library management. Backup & Restore is scalable and can be adjusted to different client-server environments. This software also features disaster recovery techniques, comprehensive status reports, increased productivity with a GUI and maximum availability of network resources and storage devices.

Backup & Restore also provides unattended, automatic backup and recovery for standalone and networked workstations and servers via a centralized backup server. Once the backup server is connected to the client-server network or workstation via Ethernet, Token Ring or FDDI and interfaced to the optical or tape jukeboxes, the system administrator establishes site-specific parameters with a menu.

This software allows any UNIX, NFS, Novell, Windows NT, DecNet or Apple client or server network access, backup and recovery with automated optical and tape jukeboxes. Backup & Restore uses WORM, rewritable or tape media for client and server operations. Contact QStar Technologies Inc., 600 East Jefferson St., Rockville, MD 20852; (301) 762-9800.

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## STS's SmartLook Adds Automated Indexing

STS Systems announced Release 2.3 of SmartLook, the system that lets PC users view mainframe, midrange and PC-based reports online, as well as selectively printing only the information needed with indexing. Indexing allows new report data received by SmartLook to be made ready to be searched by the end user. This feature organizes archived reports into a database-style storage design that allows reports to be called up based on type, date or time originated or by using data extracted from the report itself, such as words or phrases. Pre-designed templates for indexing each report are provided with SmartLook.

Release 2.3 costs \$495 and runs on any IBM-compatible network or 386 DX PC (486 DX PC recommended) with 4 MB of memory and 7.5 MB of hard disk space. Microsoft Windows 3.1 also is required. Contact STS Systems, 2800 Trans-Canada Hwy., Pointe-Claire, PQ H9R 1B1; (514) 426-0822.

*Circle 392 on reader card*

## IX/Connect Provides NS/VT Access For UNIX

Software Licensing Corp. announced IX/Connect, an add-on product for the IX/92 terminal emulation software. IX/connect enables users of IX/92 to make network connection to HP 3000 computers using HP's NS/VT networking protocol. This connection offers faster access and less network traffic.

IX/Connect is available for HP-UX,

Solaris 2 (SunOS 5) and SCO UNIX. Prices start at \$245 per session.

Contact Software Licensing Corp., Ste. 280, 930 Tahoe Blvd., Unit #802, Incline Village, NV 89451; (702) 832-0881.

*Circle 391 on reader card*

## OSA90 Enhanced By 3D Graphics

Optimization Systems Associates Inc. announced OSA90/hope Version 3.0, a CAD software system for simulation, modeling and optimization of linear and nonlinear analog circuits. Version 3.0 features 3D graphics for user-controllable visualization of design data and contour plotting.

Calculations of eigenvalues, eigenvectors and data statistics are built-in functions. Enhancements in Version 3.0 include Monte Carlo Graphics Views, user-definable key map, text exchange with other X applications, as well as new macro commands.

Contact Optimization Systems Associates Inc., 163 Watson's Lane, Dundas, ON L9H 6L1; (905) 628-8228.

*Circle 390 on reader card*

## InTEXT Announces Object Router

InTEXT Systems announced the Object Router, a profiling and routing toolkit that provides text and document filtering solution for corporations' online information systems. The Object Router can engage agents to search their organizations' databases for specific data and route this data to user-defined folders for easy access and storage. This software is capable of gaining content

knowledge of live and stored information.

Features of the Object Router include the ability to create customized information profiling and management solutions for a users own databases, self-tuning filters which learn from streams of texts which data is relevant or irrelevant and objective relevancy ranking based on the users needs and specifications.

The Object Router can be used on Windows 3.1, SunOS, Solaris, AIX and HP-UX. Prices range from \$5,000 to \$250,000. Contact InTEXT CP Software Group, 715 Sutter St., Ste. B, Folsom, CA 95630; (916) 985-4445.

*Circle 389 on reader card*

## Stanford Tech Introduces MetaCube Family

Stanford Technology Group Inc. announced MetaCube, an open family of decision support software for large-scale databases. MetaCube transforms relational databases into high-performance OLAP Servers.

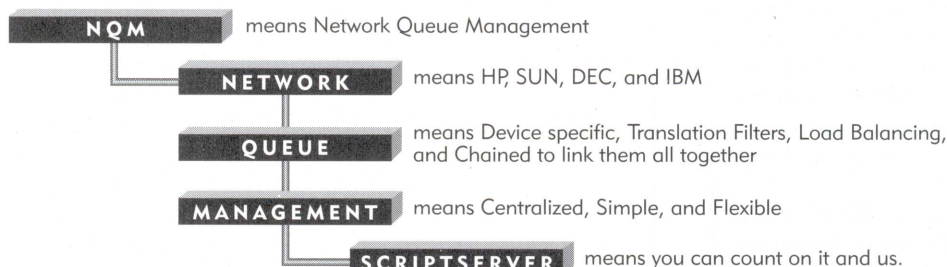
This software has the ability to pre-summarize frequently-requested data, to run queries in the background on the server, and to warn users before starting long-running queries. MetaCube supports relational databases from the major open systems vendors.

MetaCube's OLE implementation enables development environments (Visual Basic and PowerBuilder) and productivity applications (Microsoft Excel) to directly front-end the Data Warehouse.

The MetaCube family includes: MetaCube Explorer, an ad hoc decision support software for end users; MetaCube Warehouse Manager,

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a graphical tool; and MetaCube Agents, which perform user queries and administrative tasks on the database server in the background.

The Explorer and Warehouse Manager are available on Microsoft Windows. The Agents are available on HP, Sun Solaris, Sequent and IBM RS/6000. Metacube supports relational databases from Informix, Oracle and Tandem.

Price is \$1,000 per user, with complete packages starting at \$50,000.

Contact Stanford Technology Group Inc., 88 Kearny, 17th Fl., San Francisco, CA 94108; (415) 288-7960.

*Circle 385 on reader card*

### **MicroTech's Disc Duplicator Provides 4-Color CD Printing**

MicroTech Conversion Systems announces ImageMaker software that applies 4-color titles and graphics to the surface of recordable CD media. The print system requires CD-R media with an ink-adhering surface.

The ImageMaker can produce as many as 48 discs per hour, up to 12 copies of a CD master simultaneously using writable/recordable media, and write a 650 MB disc in about 18 minutes.

A 4-color bubble jet printer also can be purchased with the CD Duplicating System. It features a single disc, caddy-feed and manual loading. Print quality is 360 x 360 dpi, and printing speed is 170 cps at 10 cpi and 340 cps at 20 cpi.

Offered as an option on the ImageMaker recordable duplication system, the printing software sells for \$2,000 per system. With the printer, it sells for \$3,000.

Contact MicroTech Conversion System, 940 Industrial Ave., Palo Alto, CA 94303; (415) 424-1174.

*Circle 387 on reader card*

### **Freedman Sharp Brings Login Management To UNIX**

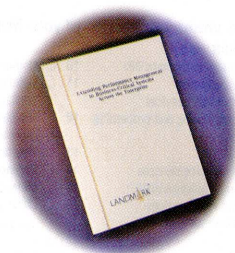
Freedman Sharp & Associates Inc. announced PowerLogin, a new system for controlling login access to UNIX machines.

PowerLogin lets system administrators control which users can log into each UNIX machine and under what circumstances. Using a flexible login policy language, you can specify such things as what time of day a user may log in, who may log in over modem lines or over the network, and whether additional passwords or authentication schemes can be used.

It also includes a flexible password-aging system, which is compatible with NIS and shadow passwords, and works across an entire UNIX network. PowerLogin can be easily

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**2. Primary end product or service of your firm at this location. (Check one)**

- |  |   |
|--|---|
| 1 <input type="checkbox"/> Manufacturing: computers/DP/ peripheral equipment | 10 <input type="checkbox"/> Communications                                  |
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| 3 <input type="checkbox"/> Other manufacturing and processing                | 12 <input type="checkbox"/> Construction, mining, agriculture               |
| 4 <input type="checkbox"/> Government  | 13 <input type="checkbox"/> Research and development                        |
| 5 <input type="checkbox"/> Educational                                       | 14 <input type="checkbox"/> Engineering/architecture                        |
| 6 <input type="checkbox"/> Financial/insurance services                      | 15 <input type="checkbox"/> Other business services                         |
| 7 <input type="checkbox"/> Distribution: wholesale/retail                    | 16 <input type="checkbox"/> Other (please specify)                          |
| 8 <input type="checkbox"/> Medical and legal services                        |   |
| 9 <input type="checkbox"/> Transportation services                           |   |

**3. Networks/Protocols installed or planned for purchase:  
(Check all that apply)**

- |   |  |                                    |
|---|--|------------------------------------|
| <b>LAN Media</b>                            | 29 <input type="checkbox"/> X.400          | 42 <input type="checkbox"/> SNA    |
| 17 <input type="checkbox"/> 10Base-T        | 30 <input type="checkbox"/> ISDN           | 43 <input type="checkbox"/> TCP/IP |
| 18 <input type="checkbox"/> Arcnet          | 31 <input type="checkbox"/> T1/E1          | 44 <input type="checkbox"/> DSLw   |
| 19 <input type="checkbox"/> Ethernet        | 32 <input type="checkbox"/> T3/E3          |                                    |
| 20 <input type="checkbox"/> Ethernalk       | 33 <input type="checkbox"/> PPP            | <b>Internet Protocols</b>          |
| 21 <input type="checkbox"/> FDDI            | 34 <input type="checkbox"/> Sonet          | 45 <input type="checkbox"/> WWW    |
| 22 <input type="checkbox"/> Token Ring      |  | 46 <input type="checkbox"/> Gopher |
| 23 <input type="checkbox"/> Fast Ethernet   |  | 47 <input type="checkbox"/> Mosaic |
|   | <b>LAN Protocols</b>                       | 48 <input type="checkbox"/> Archie |
|   | 35 <input type="checkbox"/> APPN/LU6.2     | 49 <input type="checkbox"/> Other  |
|   | 36 <input type="checkbox"/> AppleTalk      |                                    |
| <b>WAN Protocols</b>                        | 37 <input type="checkbox"/> DECnet         |                                    |
| 24 <input type="checkbox"/> Frame Relay     | 38 <input type="checkbox"/> LAT            |                                    |
| 25 <input type="checkbox"/> SMDS            | 39 <input type="checkbox"/> NFS            |                                    |
| 26 <input type="checkbox"/> ATM             | 40 <input type="checkbox"/> Novell IPX/SPX |                                    |
| 27 <input type="checkbox"/> Private Network | 41 <input type="checkbox"/> OSI            |                                    |
| 28 <input type="checkbox"/> X.25            |  |                                    |

**For More Information:**

For more information on how to register for the Expo, Conferences and Tutorials, contact: Robin Leven, Registration Coordinator, via email: leven@cardinal.com or call (215) 643-8027.

For more information on how to become an exhibitor, contact Gary Millrood, Show Director, via e-mail: millrood@cardinal.com or call (215) 643-8050.

For more specific information on the TCP/IP Tutorials, contact: Alan Clegg, American Research Group, via e-mail: questions@arg.com or call (919) 380-0097, ext. 237.

For more information on speaking at the TCP/IP Conferences, contact: Jeff Silha, Conference Director, via e-mail: jbs@shore.net or call (215) 643-8066.

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**4. In my job, I specify, recommend, approve, purchase or influence the purchase of the following:  
(Check all that apply)**

- |  |  |
|--|--|
| 50 <input type="checkbox"/> Hubs                       | 63 <input type="checkbox"/> ISDN Access Devices                          |
| 51 <input type="checkbox"/> NIC Cards                  | 64 <input type="checkbox"/> PCMCIA cards                                 |
| 52 <input type="checkbox"/> Modems/Multiplexers        | 65 <input type="checkbox"/> SNA Devices                                  |
| 53 <input type="checkbox"/> Wireless LANS              | 66 <input type="checkbox"/> Communications Software- TCP/IP Applications |
| 54 <input type="checkbox"/> Bridges                    | 67 <input type="checkbox"/> Network Management/Monitors                  |
| 55 <input type="checkbox"/> Routers                    | 68 <input type="checkbox"/> Network Security                             |
| 56 <input type="checkbox"/> Gateways                   | 69 <input type="checkbox"/> SNMP Software                                |
| 57 <input type="checkbox"/> Ethernet Switches          | 70 <input type="checkbox"/> Internet Access                              |
| 58 <input type="checkbox"/> Fast Ethernet Switches     | 71 <input type="checkbox"/> X Windows                                    |
| 59 <input type="checkbox"/> ATM Switches               | 72 <input type="checkbox"/> Remote Communications                        |
| 60 <input type="checkbox"/> T1/T3 Access Devices       | 73 <input type="checkbox"/> RMON Software                                |
| 61 <input type="checkbox"/> CSU/DSUs                   | 74 <input type="checkbox"/> Other  |
| 62 <input type="checkbox"/> Frame Relay Access Devices |  |

**5. On an annual basis, how much do you anticipate your organization will spend on TCP/IP products?**

- |  |  |
|--|--|
| 75 <input type="checkbox"/> Over \$5 million           | 78 <input type="checkbox"/> \$100,001 to \$500,000 |
| 76 <input type="checkbox"/> \$1,000,001 to \$5,000,000 | 79 <input type="checkbox"/> \$50,001 to \$100,000  |
| 77 <input type="checkbox"/> \$500,001 to \$1,000,000   | 80 <input type="checkbox"/> Less than \$50,000     |

**6. Number of employees in your organization.  
(All locations)**

- |   |  |
|---|--|
| 81 <input type="checkbox"/> Less than 100 | 84 <input type="checkbox"/> 1,000 - 4999   |
| 82 <input type="checkbox"/> 100 - 499     | 85 <input type="checkbox"/> 5,000 - 9,999  |
| 83 <input type="checkbox"/> 500 - 999     | 86 <input type="checkbox"/> 10,000 or more |

**7. Your role in buying decision:**

- |  |                                       |
|--|---------------------------------------|
| 87 <input type="checkbox"/> Final decision maker | 89 <input type="checkbox"/> Recommend |
| 88 <input type="checkbox"/> Specify              | 90 <input type="checkbox"/> No role   |



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SoftNet Utilities is a NetWare server emulator for UNIX platforms providing IPX-based services without inhibiting existing TCP/IP or other capabilities, DOS terminal emulation and bi-directional UNIX/Novell

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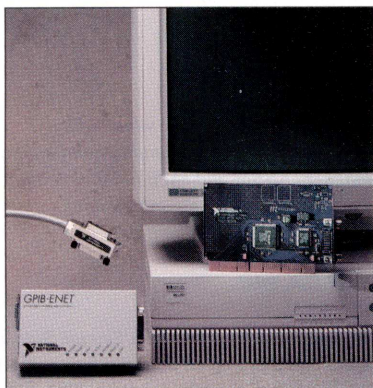
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integrated with authentication mechanisms such as smart cards to further enhance login security.

A centralized login system tracks all login activity and allows complex queries to be made as to what activities have occurred. An optional auto-logout facility guards against security problems caused by users leaving a machine without logging out.

PowerLogin is available for HP, Sun, IBM, DEC, SGI and Motorola.  
Contact Freedman Sharp & Associates Inc.,  
1011 First St. S.W., Ste. 508, Calgary, AB  
T2R 1J2; (403) 264-4822.

**Circle 384 on reader card**

### SSI's Release 3.0 Features Statistical Analysis

Systems and Synchronous Inc. (SSI) announced Release 3.0 of LANSleuth. With Release 3.0 a user can view network traffic for problem isolation and determination on Token Ring and Ethernet LANs.

LANSleuth V3.0 features statistical analysis that can station, network and trend the data. This software also features TCP/IP, Novell and AppleTalk protocols, traffic generation and PING utilities, among others.

Prices range from \$489 to \$749.  
Contact SSI, 900 East Diehl Rd., Ste. 110,  
Naperville, IL 60563; (708) 505-3900.

**Circle 388 on reader card**

### Tangible Vision Inc. Introduces Version 1.0

Tangible Vision Inc. announced Version 1.0 of its object-oriented, GUI-based, client-server manufacturing software product Imprimis.

Features include: system administrator functionality, such as maintenance of user access privileges, application and field level system security and remote login capability; sales and marketing functionality, such as creating quotations, converting quotations into customer orders and customer order processing with credit card acceptance; and inventor and warehousing functionality, such as vendor certification/performance, stock re-order planning and automated purchasing with credit card payment.

Version 2.0, slated for release later this year, also features engineering change order management, tool management, finite scheduling, capacity and material requirements planning (CMRP), among others.

This software is portable across HP 9000, IBM RS/6000, DEC Alpha, Sun SPARC-servers, Compaq Proliants, Oracle, Sybase, Informix, DB2, SQL Server, Novell NetWare, Windows NT, HP-UX, AIX and

Solaris client operating systems and GUIs.  
Contact Tangible Vision Inc., 1933 Loomis Ave., Downers Grove, IL 60516; (708) 969-7517.

**Circle 369 on reader card**

### IXI Expands Premier Motif

IXI Corp. announced an expansion of Premier Motif software to support HP platforms in addition to IBM and Sun. This software is designed so that developers building complex applications never need to change their code because of cross-platform inconsistencies in the underlying Motif tool kit.

IXI Premier Motif is identical across platforms. It is based on OSF/Motif 1.2 and offers smooth migration to CDE together with the guarantee of cross-platform conformity.

Price starts at \$695.

Contact IXI Corp., 400 Encinal St., P.O. Box 1900 Santa Cruz, CA 95061; (408) 427-7700.

**Circle 368 on reader card**

### Liant, Documentum Develop EDMS For New Platforms

Liant Software Corp. announced that Documentum Inc. will use Liant's C++/Views Multiplatform Application Framework to develop its Documentum Enterprise Document Management System (EDMS) for Windows 3.x, Apple Macintosh System 7.x, Motif 1.2 (X11R5), SunOS 4.1x, Solaris 2.3, HP-UX 9.01 and IBM RS/6000 AIX Motif.

EDMS is a family of client-server software that provides document management services in a workflow environment. EDMS features Documentum Workspace, a graphical user environment; Documentum Server, a repository-based application server; and Documentum Toolkit, a development kit for customizing the system's screens and dialogs. C++/Views is used for developing multi-platform, native GUI programs using C++.

Release 2.0 of Documentum Workspace is available on Microsoft Windows and Macintosh. Release 2.0 of Documentum Server is available on HP-UX and Sun Solaris servers. Documentum release 2.0 supports Oracle and Oracle7.

Contact Liant Software Corp., 959 Concord St., Framingham, MA 01701; (800) 237-1873.

**Circle 367 on reader card**

### SoftQuad Offers New Platforms For HoTMetaL PRO

SoftQuad Inc. announced the availability of HoTMetaL PRO (HTML) on the following platforms: Apple Macintosh, SGI/IRIX, HP-



UX, IBM AIX and RS/6000, Sun SPARC Solaris 2 and Dec Alpha OSF/1. HTML features templates, dialog box support for linking to other documents, context-sensitive search and replace, WYSIWYG tables, flexible style sheets and an importing feature that cleans and converts invalid HTML documents.

HTML is priced at \$195.

Contact SoftQuad Inc., 56 Aberfoyle Crescent, Toronto, ON M8X 2W4; (416) 239-4801.

*Circle 366 on reader card*

## Ki Networks Provides ConSoleManaGeR

Ki Networks Inc. announced ConSoleManaGeR. This software provides flexibility for managing out-of-band devices, such as X.25 telephone switches, print servers and hubs, including products from Cisco, Bay Networks and UB Networks. In addition to managing VAX and PDP consoles, ConSoleManaGeR acts as a management interface for such system consoles as Prime, Tandem, HP 3000 and AS/400. The product runs under HP's OpenView and OperationsCenter, and IBM's NetView for AIX.

Price is \$15,000 per platform and includes unlimited usage.

Contact Ki Networks Inc., 6760 Alexander Bell Dr., Columbia, MD 21046; (410) 290-0355.

*Circle 365 on reader card*

## dataDisc Introduces QuickSearch For CD-ROM

dataDisc announced QuickSearch, a CD-ROM publishing and archiving software. QuickSearch is designed for publishing electronic catalogs, books, magazines, user manuals, regulations and textbooks, as well as archiving records.

QuickSearch performs single and multiple-word searches, wildcard searches and proximity searches (words within so many words of other words). It also can search for images and can display the associated text.

Controlled by a mouse or keypad, QuickSearch can print text, images or screens to a laser printer. An electronic notepad allows users to add notes to the text.

Contact dataDisc, 10334 Battlevue Pkwy., Manassas, VA 22110; (800) 328-2347.

*Circle 364 on reader card*

## Kenan Upgrades Acumate ES

Kenan Technologies announced Acumate ES Version 1.2, which boosts Acumate ES' ability to handle large and sparsely populated datasets. Acumate ES HyperSparse Array

Support allows Acumate databases to address over 100 trillion logical cells in a multi-dimensional dataset. This enhancement puts the product into the OLAP market, making it scalable to provide end-to-end data retailing functionality from data extraction, consolidation, and staging to end-user access, analysis and reporting.

Version 1.2 also offers an enhanced Acutrieve data analysis and reporting

application. For end-users, this software offers a view designer that allows users to quickly highlight and navigate complex hierarchies and multidimensional database structures.

Other front-end applications and screens can be integrated into Acutrieve. The graphical environment-including toolbars, icons, drilling and exception highlighting-can be used to build customized applications.

Pricing begins at \$25,000 for a minimum



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700/44 Display Terminal	<b>\$295</b>
2392A Display Terminal	<b>\$245</b>

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2566B, 900 lpm	<b>\$6,950</b>
2566A, 900 lpm	<b>\$4,500</b>
2564C, 840 lpm	<b>\$6,500</b>
2564B, 600 lpm	<b>\$4,995</b>
2563C, 420 lpm	<b>\$3,800</b>
2563B, 300 lpm	<b>\$2,950</b>
2563A, 300 lpm	<b>\$2,450</b>
2934A, 200 cps	<b>\$995</b>
2932A, 200 cps	<b>\$750</b>
2235A, Ruggedwriter	<b>\$600</b>
2225D, Thinkjet	<b>\$195</b>
2680A, 45 ppm laser	<b>\$5,500</b>

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C1520B, 2.0 Gb SCSI	<b>\$1,900</b>
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C1511A, 1.3 Gb HPIB	<b>\$1,400</b>
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7980XC with Data Compression	<b>\$1,800</b>
9144A 16-track	<b>\$295</b>

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A2511A, 64 Mb for 9X7	<b>\$3,450</b>
A2232A, 32 Mb for 9X7	<b>\$1,800</b>
A2231A, 16 Mb for 9X7	<b>\$1,150</b>
A1152A, 64 Mb for 980	<b>\$17,000</b>
A1104A, 16 Mb for 950/60/80	<b>\$995</b>
A1623A, 32 Mb for 925/35/49	<b>\$3,200</b>
A1037A, 16 Mb for 925/35/49	<b>\$850</b>
A1437A, 32 Mb for 922/32/48	<b>\$2,900</b>
A1436A, 16 Mb for 922/32/48	<b>\$1,600</b>
A1404A, 8 Mb for 922/32/48	<b>\$895</b>
A2513A, 64 Mb for 720/35/50	<b>\$3,700</b>
A2512A, 32 Mb for 720/35/50	<b>\$1,600</b>

## DATACOM

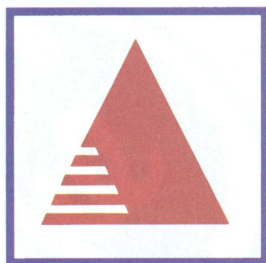
2345A, 48-port DTC	<b>\$1,150</b>
2346A, option 803 DTC card	<b>\$950</b>
2346C, option 625 DTC card	<b>\$800</b>
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C2204A, 1.3 Gb fiberoptic	<b>\$2,900</b>
C2201A, 670 Mb fiberoptic	<b>\$1,500</b>
C2203A, 670 Mb HPIB	<b>\$1,450</b>
7937H, 571 Mb HPIB	<b>\$450</b>
7963B, 304 Mb HPIB	<b>\$800</b>
7958A, 132 Mb HPIB	<b>\$300</b>
C2282A, 670 Mb internal	<b>\$1,200</b>



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CIRCLE 203 ON READER CARD



of five-user client-server configuration. Contact Kenan Technologies, One Main St., Cambridge, MA 02142; (617) 225-2224.

Circle 363 on reader card

### Alida Inc. Introduces GT Backup Release 4.4

Alida Inc. announced Release 4.4 of GT Backup, its network-based backup, restore and tape management software which supports HP-UX 9.0 platforms and employs the Motif GUI. In addition to support for Sun's SPARCstations running Solaris 2.4 and IBM RS/6000 platforms, Release 4.4 enables GT Backup to run on HP/Apollo 9000 Series 700/800 workstations and servers. This software also features a Motif, as well as OpenLook, GUI plus a character-based user interface.

Designed to eliminate unexpected data loss, GT Backup features standard UNIX tape formats which allow for independent recovery. It also simultaneously performs multiple backups and writes to multiple tape drives.

Price is \$395 for a single user license. Contact Alida Inc., 27 McDermott Place, Bergenfield, NJ 07621; (800) 883-GURU.

Circle 362 on reader card

### Answer Announces Apriori GT 2.0

Answer Systems Inc. released Apriori GT 2.0, a client-server helpdesk solution.

Apriori 2.0 features QSearch, intelligent multiwindowing and integrated multimedia support. QSearch is a quick search problem resolution tool that uses natural language input to allow support professionals to identify possible solutions to a problem. When used on any incident or problem report, this feature automatically performs a symptom search of the Apriori knowledge base and returns a list of possible solutions. Intelligent multiwindowing capabilities let users view an incident, problem report and document at the same time. Integrated multimedia support allows users to access graphics and audio-visual components via hyperlinks from within a document.

Apriori displays on virtually any desktop under Microsoft Windows, Motif, OPEN LOOK and character-based interface. The product runs on UNIX platforms, including RS/6000, HP 9000 and Sun workstations. Pricing begins at \$50,000 for a 10-user system.

Contact Answer Systems Inc., 2 N. Second St., Ste. 1000, San Jose, CA 95113; (800) 677-2679.

Circle 361 on reader card

### Number Nine Demonstrates Imagine128-Accelerated-X

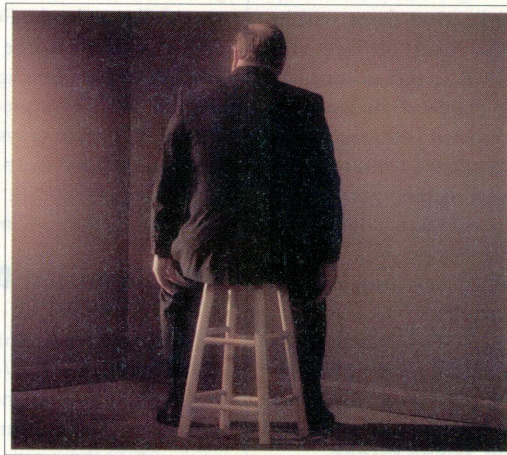
Number Nine Visual Technology announced that the 128-bit Imagine128 Graphics Accelerator Card has broken the 500,000 X-stones performance barrier using standard Dell Dimension XPS P90. Imagine128 was configured with Accelerated-X, an X server developed by X Inside Inc.

Accelerated-X is an X server that boosts

system performance and increase screen resolution and color capabilities for SCO Open Desktop and SCO UNIX, Sun's Solaris /x86, Berkeley Software Design's BSD/OS, Interactive UNIX, Novell's UnixWare, Linux, FreeBSD, ESIX, On-site's 4.2 and other UNIX system V implementations. Accelerated-X supports resolutions on Imagine128 up to 1600 x 1200 with 65,636 colors, and up to 1152 x 900 with 16.8 million colors.

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CIRCLE 253 ON READER CARD



Contact Number Nine Visual Technology, 18 Hartwell Ave., Lexington, MA 02173; (617) 674-0009.

*Circle 360 on reader card*

## **Sherpa Ports PDM To PCs With PC Client**

Sherpa Corp. announced it is porting its Sherpa system to IBM-compatible PCs with PC Client. Users will be able to tap Sherpa's data and document vault, engineering change, configuration management and other PDM capabilities to access and manage product information.

Features of the Sherpa PC client include: the ability to view drawings and their markups at any time; the ability to add files to the data and document vault using a standard Windows dialog box; to launch any Windows-based application from within Sherpa, such as Microsoft Office and Autodesk's AutoCAD. A feature of the GUI on Sherpa clients is its graphical configuration editor. This allows a product configuration to be graphically represented as a branching tree of parent-child relationships between a product's assemblies and their component parts. Parts from existing product configurations can be dragged and dropped into new product configurations.

Contact Sherpa Corp., 611 River Oaks Pkwy., San Jose, CA 95134; (408) 433-0455.

*Circle 359 on reader card*

## **EAGLE Software Introduces DISK\_PAK V3.00 For UNIX**

EAGLE Software announced version 3.00 of DISK\_PAK for UNIX. DISK\_PAK eliminates file system fragmentation and clusters frequently accessed files for peak file systems responsiveness. Also added is a new user interface that has the look and feel of OSF/Motif. This software allows multiple scans and organizes to be done simultaneously. Scans and organizes also can be interrupted during any phase of the optimization process.

DISK\_PAK for UNIX supports HP-UX 9.x on HP 9000 Series 700/800 platforms. It also supports HP disk peripherals as well as third-party peripherals supported by HP-UX.

The software reads system configuration files to identify existing files that may be organized as well as the ability to specify locations and priorities of selected files. Files can be entered as frequent, archive, transient for temporary files or static for files that the system administrator determines not to be touched by DISK\_PAK.

The program can organize file systems up to two GB on AIX, SCO, SunOS and CLIX. It organizes file systems up to four GB on

HP-UX and goes above four GB on DG/UX. There is no limit to the file system size. DISK\_PAK can organize on Solaris systems. Contact EAGLE Software Inc., 123 Indiana Ave., P.O. Box 16, Salina, KS 67402; (913) 823-7257.

*Circle 358 on reader card*

## **Adager Announces Jumbo Dataset**

Adager announced Jumbo dataset support for HP database administrators who rely on the latest IMAGE/SQL technology. The new POSIX-based data structure, HP's latest enhancement to its IMAGE/SQL database for HP 3000 systems, can hold more than 4 GB of information per dataset.

The Adager software automatically detects Jumbo datasets, and manages those datasets' special files under the POSIX hierarchical file system. It ships as one set of modules with enough internal intelligence to optimize for any HP 3000 or for pre-POSIX and POSIX-compliant operating systems.

Contact Adager Corp., The Adager Way, Sun Valley, ID 83353; (208) 726-9100.

*Circle 373 on reader card*

## **4th Dimension Delivers CONTROL-O/PC**

4th Dimension Software introduced CONTROL-O/PC Version 2.0, a comprehensive solution for the automating systems operations. This software harnesses the power of the OS/2 Presentation Manager to provide a consolidated point of control for managing remote operations and unattended operations of MVS, VM, Data General AOS, VAX/VMS, AS/400 systems, HP-UX, Sun SPARC and Solaris, and IBM RS/6000.

CONTROL-O/PC automatically manages all system-level activities, from system initiation through planned shutdowns. The control tools provide an efficient way to establish parameters and implement and maintain automated response applications. This software also includes a completely automated inbound and outbound voice messaging facilities to alert personnel of critical events at work or at home. The Distributed Automation utility enables users to implement automatic responses to events detected on mainframes, servers and desktops.

Pricing is structured on a per-platform and multiple copy basis and begins at \$11,000.

Contact 4th Dimension Software Inc., One Park Plaza, 11th Fl., Irvine, CA 92714; (714) 757-4300.

*Circle 357 on reader card*

## **a/Soft Updates nu/TPU v4.1**

a/Soft Development Inc. updated nu/TPU, its VMS-compatible text editor, to version 4.1. Whatever the platform or operating system, VMSers can use nu/TPU to receive editing tools including EVE, EDT, WPS and TPU.

Supported platforms include MS-DOS, Microsoft Windows, Alpha NT, Intel NT, SCO UNIX, SunOS, Solaris, HP-UX, RISC/Ultrix, Alpha OSF/1, SGI, AIX, Intergraph, UnixWare, Cray, Convex, Sequent PTX and Motorola 88000. All UNIX platforms are integrated with Motif, giving users an intuitive GUI mode in which to edit. nu/TPU's Motif and Windows environments allow users to execute commands with the mouse via pull-downs, pop-ups and dialog boxes, as well as select text, maneuver within windows via scroll bars and resize windows.

Added features to this software include a new command, find, find attributes and systems attributes dialog boxes. Multiprocessing is now supported by the Motif version of nu/TPU v4.1. Font style, size and color are user-definable within an editing session and 80- and 132-column widths are now supportable.

Contact a/Soft Development Inc., 24 Eastman Ave., Bedford, NH 03110; (603) 666-6699.

*Circle 356 on reader card*

## **Ipsys OBJECT IE Supports ORBs And Visual C++**

Ipsys Software has enhanced OBJECT IE to provide integration with Object Request Brokers (ORBs) in order to support the CORBA initiative and Microsoft's Object Linking and Embedding (OLE 2) product. To provide another route to integration with OLE 2, IPSYS is generating Visual C++. Developers will be able to prototype a screen using OBJECT IE's integral screen painter and then generate the Visual C++ version.

All code that is generated is compatible with Visual C++ ClassWizard and AppStudio. This software generates all of the codes for a large scale client-server application including GUI code, business logic and database code. Business logic may run on PCs or workstations, application servers or database servers or any combination of these. Regional database design can be maintained within Ipsys OBJECT IE and, when desired, Data Definition >Language (DDL) files may be automatically generated the chosen RDBMS environment.

Contact Ipsys Software, 388 Market St., Ste.



400, San Francisco, CA 94111; (415) 693-9200.

Circle 433 on reader card

## HARDWARE

### Tektronix Introduces XP200H Series

Tektronix announced the TekXpress XP200H series, an extension of the popular XP200 family, which meets the demand for high-resolution color and larger screen sizes for entry-level graphical access to enterprise network information.

The X desktops are targeted for businesses requiring simultaneous access to mainframe (IBM 3270/3179G, 3287), DEC VAX and open systems applications. And with Tektronix' new WinDD software (based on Microsoft Windows NT 3.5) the XP200H series desktops are capable of accessing Windows PC applications from one or more 486 or Pentium application servers. The new XP200H monochrome model provides an attractively priced solution for document retrieval and CASE applications.

XP200H terminals include a modular logic base and can be configured with either a color (17- or 19-inch) or monochrome (19-inch) monitor. Prices start at \$1,995.

XpressWare software and WinDD software. XpressWare offers multimedia capabilities such as digital video, audio, XIE imaging, Adobe Display PostScript page description languages, Adobe Acrobat portable document format, as well as centralized remote administration capabilities and legacy system emulation. With WinDD, multiple TekXpress terminals can access off-the-shelf Windows applications from one or more PC application servers.

All prices include keyboard, mouse, 4 MB RAM (expandable to 36 MB), two serial ports and cable cover with a security loop. Also, the H series desktops offer two PCMCIA slots, allowing for a combination of Type I, II or III PCMCIA card adapters. All XP200H series desktops are equipped with the 25 MHz LSI 33020 RISC processor, and can accept thinnet and twisted-pair Ethernet.

Contact Tektronix, 26600 S.W. Pkwy., P.O. Box 1000, Wilsonville, OR 97070; (503) 685-2583.

Circle 383 on reader card

### Winchester's FlashDisk Works With Open Systems

Winchester Systems Inc. announced the FlashDisk SCSI series of RAID disk arrays for open systems. FlashDisk delivers 2,200 disk

read/write operations per-second-per-disk controller. Each caching controller includes up to 64 MB cache memory and a high-speed Intel 486 processor. FlashDisk is targeted for database, transaction processing, multimedia, imaging and other disk intensive applications.

Hardware fault tolerance also is offered. These features include redundant power supplies, hot swap disks and redundant fans

that enable the disk array and host to keep running while any of these failed components are replaced.

FlashDisk is compatible with DEC, Sun, HP, IBM, SGI and Mac. It supports any operating system including UNIX, Windows NT, MacOS, OpenVMS, HP-UX, SunOS, AIX and Solaris.

Prices range from \$5,250 to \$159,995.

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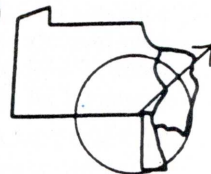
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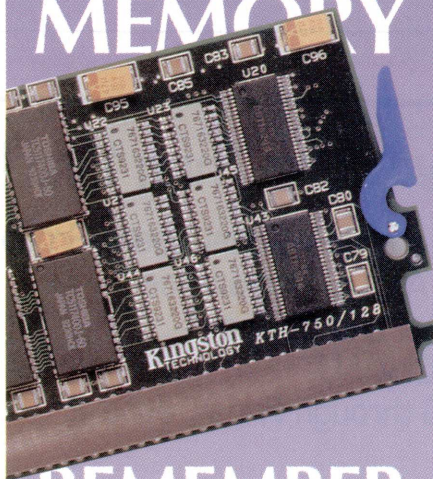
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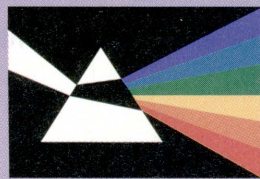


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THE INSIDE NAME IN UPGRADES

CIRCLE 273 ON READER CARD

## new products

Contact Winchester Systems, 400 West Cumming Park, Woburn, MA 01801; (617) 933-8500.

Circle 382 on reader card

### Kalidor Provides K2000 Pen-Based Computer

Kalidor announced K2000 Pen-based Computer with an 85 MB ruggedized hard disk drive. It is a full-function pen computer for complete information system integration. Field personnel can easily access corporate data.

Other features include 8 MB of RAM that can expand to 16 MB, a ROM-based boot and recovery utility and the ability to transfer and network utilities. This 3.5 lbs. computer runs Windows for Pen, PenDos and PenRight!Pro. The K2000 Pen-based Computer is available in PCMCIA Type I or Type II.

Contact Kalidor, 400 N. Mountain Ave., Ste. 310, Upland, CA 91786; (909) 931-3888.

Circle 381 on reader card

### CompuSci Inc. Offers PowerEdge SNMP Agent

CompuSci Inc. announced the PowerEdge SNMP Agent Single-Port Device for use with UPSs.

PowerEdge SNMP allows users of contact-closure or RS-232 UPS to monitor and administrate UPS via SNMP protocol over TCP/IP networks. Compliance with UPS standard MIB ensures compatibility with a wide number of Network Management Systems, such as HP OpenView, IBM Netview, Novell NMS and Sun NetManager.

PowerEdge SNMP also works with CompuSci's PowerEdge Power Monitoring Software Release 2.0 to provide for automatic shutdown of computer systems when power fails, as well as support for the PowerEdge SmartSocket+ power management device.

PowerEdge SNMP is easily configured for use with a contact-closure UPS via a DIP switch setting. Network addresses for the unit and NMS stations are entered via a simple conversation through the serial port.

PowerEdge SNMP is field upgradable. Future firmware enhancements can be loaded into the unit without opening the enclosure.

PowerEdge SNMP technical specifications: built-in LAN interface connectors, 10Base-T and 10Base-2 (BNC); one serial port (38.4 Kbaud); green power and red status LEDs indicate ERROR and COMM; DIP switches for normal/installation selection and RS-232 v. Contact Closure UPS connection; 5VDC input, 700mA maximum, 100mA nominal; dimensions are 4.0-inch x 3.5-inch x 1-inch; and FCC Class A Compliant.

Price is \$399.

Contact CompuSci Inc., 1642 Manufacturers Dr., Fenton, MO 63026; (314) 343-5022.

Circle 329 on reader card

### Welch Allyn Announces Scan\*Stylus

Welch Allyn announced Scan\*Stylus for pen computing and bar code scanning. This hardware features SCANTEAM "wedge in a wand," which interfaces to the keyboard or serial port.

The Scan\*Stylus accommodates most standard pen styluses for use with mobile computers such as laptops, notebooks, PCs and portable data collection terminals.

Scan\*Stylus, with a keyboard interface is priced at \$425.

Contact Welch Allyn, 4619 Jordan Rd., Box 187, Skaneateles Falls, NY 13153; (315) 685-4100.

Circle 377 on reader card

### Metrum Introduces Metrum O-626

Metrum Peripheral Products introduced METRUM O-626, an expandable optical disk library. This hardware is designed for multiuser imaging and archival storage applications that require high-speed system response in an active high transaction environment.

Using 5.25-inch magneto-optical rewritable or WORM optical disks, each storing 1.3 GB of data, the library features up to 15.6 GB of online and 814 GB of near-line storage capacity. The O-626 can be configured with from two to 24 high-speed, 5.25-inch magneto-optical drives and up to 626 optical disks.

Pricing varies with drive configuration and storage capacity. A six drive system with a 722 GB storage capacity costs \$209,500.

Contact Metrum Peripheral Products, 4800 E. Dry Creek Rd., Littleton, CO 80122; (800) 359-3188.

Circle 379 on reader card

### Micom's UVM Increases Voice Quality

Micom Communications Corp. announced the Universal Voice Module (UVM), a voice/fax card that increases voice quality at a digitizing rate of 16 Kbps and below over Micom-based data/voice/fax/LAN integrated private networks. This hardware ensures voice communications over multisite and point-to-point networks.

The UVM fits inside the company's Marathon and NetRunner Data/Voice Integration product range and accommodates up to two interface modules.

Micom also offers a UVM interface module, Fax Relayor, for \$200. It allows



companies to save on fax costs by using the same fax for private and public network inbound and outbound transmissions.

Prices range from \$1,200 to \$1,800.

Contact Micom Communications Corp., 4100 Los Angeles Ave., Simi Valley, CA 93063; (805) 583-8600.

*Circle 380 on reader card*

### **LXE, Motorola Provide LXE's RF ID Tag**

LXE Inc. and Motorola's Indala Corp. announced LXE RF ID, an integration of Indala RF ID tag readers into LXE's handheld RF terminals. LXE RF ID tag readers can be used where conventional bar codes cannot, such as harsh or dirty environments.

LXE RF ID tags can be implanted within floors for floor-storage situations or inside materials for tracking purposes. LXE wireless networks support frequency-hopping spread or frequency-synthesized narrowband radios. Contact LXE Inc., 303 Research Dr., P.O. Box 926000, Norcross, GA 30092; (404) 447-4224.

*Circle 378 on reader card*

### **Artecon's LynxTower Offers Deskside RAID**

Artecon announced LynxTower, a modular RAID mass storage deskmount subsystem based on the Lynx storage technology. LynxTower can support any combination of up to seven hot plugs, with removable Lynx units for a total of over 29 GB of removable mass storage with a very small footprint.

LynxTowers can be interlocked with legs that snap units together. A twin LynxTower of 14 Lynx units can support over 58 GB, while a quad can deliver over 116 GB of hot plug, removable storage.

For a LynxTower with a single Lynx-RAID controller prices start at \$8,995 and vary depending on configuration. Contact Artecon, P.O. Box 9000, Carlsbad, CA 92018; (619) 931-5500.

*Circle 376 on reader card*

### **RGB Spectrum Releases SuperView 50-6**

RGB Spectrum announced SuperView 50-6, a system that displays up to six video sources in realtime on a computer monitor or projection screen.

This hardware displays video signals in windows on workstation screens up to 1280 x 1024 pixel resolution. The video windows can be positioned, overlapped, scaled to full

screen and overlaid with computer graphics. The systems will accept NTSC (or PAL) composite and Y/C (S-Video or Hi-8) signals from a camera, tape recorder, video disc or teleconferencing system.

X.TV software offers an X Windows GUI to manipulate the windows, adjust video parameters, control graphic overlays and store video images to disk. The systems also can be controlled by a set of ASCII commands embedded in the user applications.

SuperView is compatible with virtually all PCs and workstations.

Contact RGB Spectrum, 950 Marina Village Pkwy., Alameda, CA 94501; (510) 814-7000.

*Circle 375 on reader card*

### **Output Debuts Model 4100 Printers**

Output Technology Corp. announced Model 4100 line of high-speed matrix printers for business printing including multipart forms, high volume business and data processing reports, label and bar codes. The line includes the Model 4130, a 300 line-per-minute printer optimized for wide-carriage work and the 4140, a 400 line-per-minute printer for narrow-carriage projects.

Both 4100 printers are priced at \$2,995. Contact Output Technology, 2310 N. Fancher Rd., Spokane, WA 99212-1381; (509) 536-0468.

*Circle 374 on reader card*

### **PNY Offers HP 9000 Memory Upgrades**

PNY Electronics Inc. shipped memory expansion kits for HP 9000 workstations.

PNY's memory upgrade kits are compatible with all hardware and software for HP 9000 Series 700 (Models 720, 730, 735, 750 and 755). Upgrades for Models 705, 710, 712, 715 and 725 will be released shortly.

The HP 9000 memory upgrade kits are available in 16, 32, 64 and 128 MB increments.

Contact PNY Electronics Inc., 200 Anderson Ave., Moonachie, NJ 07074; (201) 438-6300.

*Circle 372 on reader card*

### **IEM Introduces TapeFrame Family**

IEM Inc. introduced TapeFrame product line featuring 8 Tape Carousel Libraries, 32 Tape Drives and 4.6 terabytes of storage capacity.

Two to eight IEM 4mm or 8mm carousel libraries, with one to four DDS-2 DAT or 8mm 8505XL drives slide into TapeFrame

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units. TapeFrame allows the SCSI bus to be split, so different drives in each carousel can be dedicated to different servers.

If a drive fails, a users can hot swap that carousel while the other carousel continues backup. If an operator is not available for intervention, TapeFrame will route the backup to a different drive of carousel (depending on application software) so backups will continue, even in multiple drive failures.

TapeFrame provides online database and cluster backup/archive, client-server network backup on UNIX file systems, UNIX file protection/backup, and archive and migration/HSM.

Contact IEM Inc., P.O. Box 1889, Fort Collins, CO 80522; (970) 221-3005.

*Circle 435 on reader card*

### Racal-Datcom Announces BRI 2000

Racal-Datcom introduced Excalibur BRI 2000 terminal adapter which offers diagnostics at three levels and security at two levels.

This hardware's two-wire access makes the BRI 2000 compatible with any

two-wire Switched 56 digital service unit (DSU), four-wire Switched 56 DSU, and other vendor's ISDN terminal adapters. BRI 200 features self-tests at power-up and the ability to place a diagnostic call if it is off-line. Security is handled by a CLID and a password. Applications that work for the BRI 2000 are leased line back-up, file transfer, disaster recovery and remote LAN access.

BRI 2000 is priced at \$1,195.

Contact Racal-Datcom Inc., P.O. Box 407044, Fort Lauderdale, FL 33340; (800) RACAL-55.

*Circle 434 on reader card*

### Logicode Technology Releases Quicktel PC Card

Logicode Technology Inc. released Quicktel 14V14PCM PC Card, voice/fax modem for laptops, notebooks or subnotebooks with Type II or Type III PC Card slots. The credit card size modem features V.32bis data transmission and V.42bis data compression and is truly plug-and-play. It sends data and faxes at 14,400 bps, and can be used as a voice mailbox.

The 14V14PCM supports a host of standard protocols including Bell 103 and 212A, V.17, V.21 ch. 2, V.22, V.22bis, MNP 2-4, MNP 5, V.25ter, V.29, V.32, ITU V.32bis, V.42 and V.42bis. Fax capabilities include Class I, Group III 14,400 bps send/14,400 bps receive.

The 14V14PCM features: automatic tone (DTMF) or pulse dialing; automatic call answering; choice of automatic or manual call originate or answer; automatic answer tone detection; automatic detection of dial tone, busy signal, ring signal and carrier; and a .5 lb. weight.

In addition, voice capabilities include up to 999 individual voice mailboxes, password protection, embedded voice mode "AT" command set, remote paging, fax on demand and Intelliselect which automatically distinguishes between data, fax or voice transmission.

Price is \$249.

Contact Logicode Technology Inc., 1380 Flynn Rd., Camarillo, CA 93012; (805) 388-9000.

*Circle 430 on reader card*

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## Intelligent Interfaces Offers HP-IB Converter

Intelligent Interfaces announced the MicroPrint 45CV HP-IB (IEEE-488) to Centronics converter, which connects HP Centronics printers, HP computers and ATE with HP-IB interfaces. The

Unite is totally transparent to the application or ATE software, and requires no software changes or additions.

MicroPrint eliminates common test and measurement equipment output problems: illegibly small or too large, off-the-page graphics when using the HP-IB test equipment with HP Centronics printers. HP printers default to their lowest or highest resolution on power up. The MicroPrint Variable Resolution mode allows convenient switch selection of resolution and graphics output size.

HP-GL mode allows inexpensive HP LaserJets to be used in place of expensive plotters. ThinkJet, PaintJet, QuietJet and DeskJet printers are supported for portrait orientation raster (bit mapped) graphics. LaserJet printers are supported for portrait and landscape raster graphics. Additionally, HP-GL mode allows LaserJet Series 3, 4 and 5 to be configured as plotters in landscape and portrait orientations.

The MicroPrint 45VC is priced at \$2909, and includes a 10-foot Centronics parallel cable.

Contact Intelligent Interfaces Inc., P.O. Box 1486, Stone Mountain, GA 30086; (404) 381-9891.

Circle 431 on reader card

## Telebyte Technology Expands Multimedia Capabilities

Telebyte Technology Inc. introduced Model 704 Super Deluxe Videoverter for converting VGA images to TV formats supporting NTSC in the United States and PAL in Europe, thus allowing computer screen displays to appear on any TV, regardless of size or type.

The Model 704 Super Deluxe Videoverter is equipped with three outputs — S-VHS, Composite and RF. The user can connect the Model 704 to any video device from a standard TV with only an RF input, to the most sophisticated TV monitors, projectors or VCRs with S-VHS input, the new industry standard for improved visual quality. Because outputs are available simultaneously, the Model 704 can drive three different output devices.

The Model 704 provides flicker-free operation for displaying a VGA image on a TV. The VGA-to-video conversion features a three-line video RAM memory, which allows the independent retiming of the NTSC/PAL signal thereby providing simultaneous display on the VGA monitor and the TV.

It supports Windows 3.0/3.1 operation on VGA modes up to Super VGA, 640 x 480

with 64,000 colors. It also supports all VGA modes in which the horizontal frequency is fixed at 31.5 KHz.

The Model 704 costs \$435. Contact Telebyte Technology Inc., 270 Pulaski Rd., Greenlawn, NY 11740; (516) 423-3232.

Circle 432 on reader card

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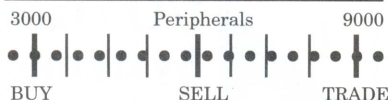
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# Plan For Obsolescence

Accounting For Obsolescence Now Helps Save Time And Money Later



Gordon McLachlan

Remember the auto industry's alledged, "planned obsolescence"? The theory was that they built cars badly enough that they would rot and fall apart about a week after you paid them off, and you would have to go buy another one. I don't know if it was an actual fact or just a conspiracy theory, but sometimes I think it might not be such a bad idea — at least for computer systems.

Obsolescence is built into every system you buy. If you purchase a system today, you know it's going to be eclipsed by something faster and more powerful in a month or two. Sooner or later that system is going to fall over. But unlike an old car, the fenders don't disintegrate and the engine doesn't drop out. Obsolescence just sort of creeps up on you, and by the time you recognize it, it's often too late.

I have seen examples of this more frequently than I care to. Companies wheezing along on nasty old systems that should have been replaced long ago. They're postponing the inevitable, because they refuse to recognize an obsolete system until it fails.

When I worked for a computer vendor, I was responsible for a couple of sites that ran emulation software, so they could keep obsolete software written for obsolete hardware, running on their shiny new boxes. Supporting them was a nightmare and trying to make modifications to the applications was even worse. What was the point? Nostalgia is nice, but I don't think it's very practical.

I certainly understand that you can't replace systems just because something a little better is available. After all, changing systems can be traumatic. But it's kinda like surgery — sometimes you just have to go through it. When it's time, you shouldn't wait.

One manufacturer I worked for postponed replacing an obsolete mainframe-based manufacturing system until it discovered it couldn't upgrade its operating system software because of an ill-behaved DBMS. All of a sudden there was a crash program to replace the systems that probably cost over \$20 million, and wound up not working as expected. The last I heard, the replacement system was being replaced.

I just got done installing software on a customer's IBM RS/6000, and in the process got a look at the manufacturing package they run on it. It's apparently a part of a system written for some long-gone hardware, developed in an obscure dialect of BASIC. They had to make some modifications to it to interface it to a fax server we installed, and I watched them kill days trying to debug the code.

The package — despite being an "online" system — was firmly rooted in 1970s technology. It doesn't use anything that even remotely resembles a decent DBMS, it seems to think a terminal is a card reader, and it isn't well integrated with their accounting and order processing systems. And, the front office is working 12-hour days to keep up with their workload.

They know they're going to have to replace this sorry system sooner or later, but they aren't doing a thing about it. In fact, they told me they were going to implement it in another company they had acquired. Why? Because it would be "cheaper" than buying a new package.

Instead of postponing the inevitable, they should be planning for it. And I feel like grabbing the ears of their DP manager and shaking his head until he agrees with me. Yes, it will cost some money. Yes, it will cause some pain. But, in a year or two, they'd all be feeling much better, and the accounting manager might even be able to go home at night to see if his kids still live there.

A large automobile manufacturer I've worked with now has a real problem with its CAD systems. They're based on hardware and software from vendors that don't even exist any longer, and they store drawings in a format they can't convert from without losing data. They've postponed the inevitable long enough that they are running out of time, fast.

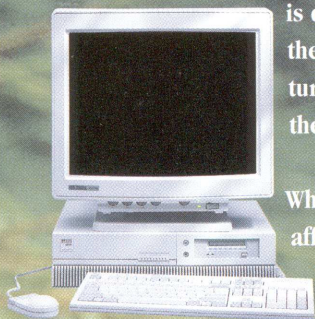
Systems planning has to cover the whole life cycle of a system, and that life cycle extends beyond a system's useful life. That's planned obsolescence, and it isn't a bad thing.

*McLachlan's Internet address:  
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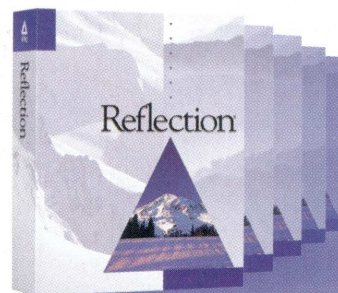
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